

**RESULTS OF THE AUGUST 25, 2005 PEME CAC  
2003 IMC, IPC, and IFGC – 2003 UMC and UPC REFERENCE ANALYSIS**

**Introduction to the Committee**

Present on the Plumbing, Electrical, Mechanical and Energy Committee on August 25, 2005 were Tom Weekes, Chair; Ellie Ross; John Lionakis; Tom Trimberger; Mary Mulrooney-Reynolds; Sudhir Agrawal; Tim Owens; Bob Guenther of International Code Council (ICC), and Jay Peters representing International Association of Plumbing and Mechanical Officials (IAPMO). Absent from the committee were Glenn Friedman and Russ King.

**Purpose of the Committee**

California Building Standards Commission (CBSC) Executive Director Stan Nishimura explained the references in the International Building Code (IBC) to other international codes that California does not adopt. He requested the committee's technical assistance to determine if provisions in California's mechanical and plumbing codes provide a comparable level of care. For analysis, referenced 2003 international code sections as validated by ICC are printed below alongside 2003 uniform code sections identified by CBSC staff. Time precluded the uniform code sections' validation by IAPMO in time for the August 25 meeting.

**Tasks of the Committee**

The sections were to be analyzed using the four scenarios listed below. After the first item, the committee chair proposed to change the word "missing" to "different" to determine technical differences, not just omissions. Since the committee was new to the process of evaluation based on these scenarios, much discussion on process ensued during the first several items. Following are the committee's technical discussions and action taken by voice vote of the committee for each item referred in the IBC to the International Mechanical Code (IMC), International Plumbing Code (IPC), and International Fuel Gas Code (IFGC).

- ☐ The requirements are equivalent.
- ☐ The uniform code is different from the international code. What is ~~missing~~ different from the uniform code:
- ☐ The uniform code does not address requirements in the international code. What is missing from the uniform code:
- ☐ The referenced sections are not readily determinate.

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IBC Code Section	IMC Code Section	UMC Code Section
<p><b>ITEM 1</b>  <b>201.3 Terms defined in other codes.</b> Where terms are not defined in this code and are defined in the <i>International Fuel Gas Code</i>, <i>International Fire Code</i>, <i>International Mechanical Code</i> or <i>International Plumbing Code</i>, such terms shall have the meanings ascribed to them as in those codes.</p>	<p>Indeterminate</p> <p><b>Committee Comments &amp; Action</b></p> <p><input checked="" type="checkbox"/> The referenced sections are not readily determinate.  Discussion by the Committee: The uniform codes direct the code user to the dictionary when terms are not otherwise defined.  Discussion from the floor: None  Passed by a vote of five to two.</p>	<p>Indeterminate</p>
<p><b>ITEM 2</b>  <b>[F] 307.9 Exceptions:</b> The following shall not be classified in Group H, but shall be classified in the occupancy which they most nearly resemble. Hazardous materials in any quantity shall conform to the requirements of this code, including Section 414, and the <i>International Fire Code</i>.  11. Stationary batteries utilized for facility emergency power, uninterrupted power supply or telecommunication facilities provided that the batteries are provided with safety venting caps and ventilation is provided in accordance with the <i>International Mechanical Code</i>.</p>	<p><b>[F] 502.4 Stationary lead-acid battery systems.</b> Ventilation shall be provided for stationary lead-acid battery systems in accordance with this chapter and Section 502.4.1 or 502.4.2.  <b>[F] 502.4.1 Hydrogen limit.</b> The ventilation system shall be designed to limit the maximum concentration of hydrogen to 1.0 percent of the total volume of the room.  <b>[F] 502.4.2 Ventilation rate.</b> Continuous ventilation shall be provided at a rate of not less than 1 cubic foot per minute per square foot (cfm/ft<sup>2</sup>) [0.00508 m<sup>3</sup>/(s • m<sup>2</sup>)] of floor area of the room.  <b>[F] 502.5 Valve-regulated lead-acid batteries.</b> Valve-regulated lead-acid battery systems as regulated by Section 609 of the <i>International Fire Code</i>, shall be provided with ventilation in accordance with Section 502.5.1 or 502.5.2 for rooms and in accordance with Section 502.5.3 or 502.5.4 for cabinets.  <b>[F] 502.5.1 Hydrogen limit in rooms.</b> The ventilation system shall be designed to limit the maximum concentration of hydrogen to 1.0 percent of the total volume of the room during the worst-case event of simultaneous boost charging of all batteries in the room.  <b>[F] 502.5.2 Ventilation rate in rooms.</b> Continuous ventilation shall be provided at a rate of not less than 1 cubic foot per minute per square foot (cfm/ft<sup>2</sup>) [0.00508 m<sup>3</sup>/(s•m<sup>2</sup>)] of floor area of the room.  <b>[F] 502.5.3 Hydrogen limit in cabinets.</b> The ventilation system shall be designed to limit the maximum concentration of hydrogen to 1.0 percent of the total volume of the cabinet during the worst-case event of simultaneous boost charging of all batteries in the cabinet.  <b>[F] 502.5.4 Ventilation rate in cabinets.</b> Continuous ventilation shall be provided at a rate of not less than 1 cubic foot per minute per square foot (cfm/ft<sup>2</sup>) [0.00508 m<sup>3</sup>/(s•m<sup>2</sup>)] of the floor area covered by the cabinet. The room in which the cabinet is installed</p>	<p><b>505.1 General.</b> A mechanical ventilation or exhaust system shall be installed to control, capture, and remove emissions generated from product use or handling when required by the Building Code or Fire Code and when such emissions result in a hazard to life or property. The design of the system shall be such that the emissions are confined to the area in which they are generated by air currents, hoods, or enclosures and shall be exhausted by a duct system to a safe location or treated by removing contaminants. Ducts conveying explosives or flammable vapors, fumes, or dusts shall extend directly to the exterior of the building without entering other spaces. Exhaust ducts shall not extend into or through ducts and plenums.  ...  Separate and distinct systems shall be provided for incompatible materials.  Contaminated air shall not be recirculated to occupied areas unless contaminants have been removed. Air contaminated with explosive or flammable vapors, fumes, or dusts; flammable or toxic gases; or radioactive material shall not be recirculated.  <b>505.2 Minimum Velocities and Circulation.</b> The velocity and circulation of air in work areas shall be such that contaminants are captured by an airstream at the area where the emissions are generated and conveyed into a product-conveying duct system. Mixtures within work areas where contaminants are generated shall be diluted below 25 percent of their lower explosive limit or lower flammability limit with air that does not contain other contaminants. The velocity of air within the duct shall be not less than set forth in Table 5-1.  Systems for removal of vapors, gases, and smoke shall be designed by the constant velocity or equal friction methods. Systems conveying particulate matter shall be designed employing the constant velocity method. Systems conveying explosive or radioactive materials shall be prebalanced through</p>

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	<p>shall also be ventilated as required by Section 502.5.1 or 502.5.2.</p> <p>[Note: These §§ are excerpts from the IFC, which California proposes to adopt.]</p> <p><b>Committee Comments &amp; Action</b></p> <p><input checked="" type="checkbox"/> The uniform code is different from the international code. What is <del>missing</del> <u>different</u> from the uniform code:</p> <p>Discussion by the Committee:</p> <ul style="list-style-type: none"> <li>• The sections in the IMC are extracted from the International Fire Code (IFC), which the State Fire Marshal (SFM) proposes to adopt, as designated by the [F]s in front of the section numbers.</li> <li>• The IMC sections, providing specific ventilation rates, are more prescriptive, whereas the Uniform Mechanical Code (UMC) sections are performance-based, not implying maximum standards of care.</li> <li>• The reference to Table 5-1 in the UMC leaves it to the engineer to design the system.</li> </ul> <p>Discussion from the floor:</p> <ul style="list-style-type: none"> <li>• Recording the committee's findings will help the state agencies in their code development process.</li> </ul> <p>Passed by a unanimous vote.</p>	<p>duct sizing. Other systems may be designed with balancing devices such as dampers. Dampers provided to balance airflow shall be provided with securely fixed minimum-position blocking devices to prevent restricting flow below the required volume or velocity.</p>
<p><b>ITEM 3</b></p> <p><b>406.4 Enclosed parking garages.</b></p> <p><b>406.4.2 Ventilation.</b> A mechanical ventilation system shall be provided in accordance with the <i>International Mechanical Code</i>.</p>	<p><b>SECTION 404</b></p> <p><b>ENCLOSED PARKING GARAGES</b></p> <p><b>404.1 Enclosed parking garages.</b> Mechanical ventilation systems for enclosed parking garages are not required to operate continuously where the system is arranged to operate automatically upon detection of a concentration of carbon monoxide of 25 parts per million (ppm) by approved automatic detection devices.</p> <p><b>404.2 Minimum ventilation.</b> Automatic operation of the system shall not reduce the ventilation rate below 0.05 cfm per square foot (0.00025m<sup>3</sup>/s • m<sup>2</sup>) of the floor area and the system shall be capable of producing a ventilation rate of 1.5 cfm per square foot (0.0076m<sup>3</sup>/s • m<sup>2</sup>) of floor area.</p> <p><b>404.3 Occupied spaces accessory to public garages.</b> Connecting offices, waiting rooms, ticket booths and similar uses that are accessory to a public garage shall be maintained at a positive pressure and shall be provided with ventilation in accordance with Section 403.3.</p> <p>From Footnote d., Table 403.3 "A mechanical ventilation system shall not be required in garages having a floor area not exceeding 850 square feet and used for the storage of not more than four vehicles or trucks of 1 ton maximum capacity."</p> <p><b>502.13 Public garages.</b> Mechanical exhaust systems for public garages, as required in Chapter 4, shall operate continuously or in accordance with Section 404.</p>	<p>No requirements in the 2003 UMC.</p> <p><b>2001 CBC §1202.2.7 Group S parking garages.</b> In Group S, Division 3 parking garages, other than open parking garages, used for storing or handling automobiles operating under their own power and on loading platforms in bus terminals, ventilation shall be provided capable of exhausting a minimum of 1.5 cubic feet per minute (cfm) per square foot (0.761 L/s/m<sup>2</sup>) of gross floor area. The building official may approve an alternate ventilation system designed to exhaust a minimum of 14,000 cfm (6608 L/s) for each operating vehicle. Such system shall be based on the anticipated instantaneous movement rate of vehicles, but not less than 2.5 percent (or one vehicle) of the garage capacity. Automatic carbon monoxide sensing devices may be employed to modulate the ventilation system to maintain a maximum average concentration of carbon monoxide of 50 parts per million during any eight-hour period, with a maximum concentration not greater than 200 parts per million for a period not exceeding one hour. Connecting offices, waiting rooms, ticket booths and similar uses shall be supplied with conditioned air under positive pressure.</p> <p><b>EXCEPTION:</b> Mechanical ventilation need not be provided within a Group S, Division 3 parking garage when openings complying with Section 311.9.2.2 are provided.</p>

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	<p><b>Committee Comments &amp; Action</b></p> <p><input checked="" type="checkbox"/> The uniform code does not address requirements in the international code. What is missing from the uniform code:</p> <p>Discussion by the Committee:</p> <ul style="list-style-type: none"> <li>• Ventilation requirements were moved from the 1997 Uniform Building Code (UBC) to the IMC with the establishment of the family of international codes. There are some ventilation requirements in §121 of the California Energy Code. Per IAPMO, ventilation standards based on ASHRAE 62 are proposed for the 2006 UMC.</li> <li>• Design for air volume is missing from the UMC.</li> <li>• The UBC provided for a range of carbon monoxide sensing not found in the IMC.</li> </ul> <p>Discussion from the floor:</p> <ul style="list-style-type: none"> <li>• CBSC staff printed the sections from the 1997 UBC for the committee to evaluate any valuable provisions.</li> </ul> <p>Passed by a vote of six with one abstention.</p>	
<p><b>ITEM 4</b></p> <p><b>406.6 Repair garages.</b></p> <p><b>406.6.3 Ventilation.</b> Repair garages shall be mechanically ventilated in accordance with the <i>International Mechanical Code</i>. The ventilation system shall be controlled at the entrance to the garage.</p>	<p>From Table 403.3, Repair garages shall be ventilated with outdoor air at a rate of 1.5 cfm/ft<sup>2</sup> of floor area being ventilated.</p> <p><b>[F] 502.15 Repair garages.</b> Where Class I liquids or LP-gas are stored or used within a building having a basement or pit wherein flammable vapors could accumulate, the basement or pit shall be provided with ventilation designed to prevent the accumulation of flammable vapors therein.</p> <p><b>[F] 502.16 Repair garages for natural gas- and hydrogen-fueled vehicles.</b> Repair garages used for the repair of natural gas- or hydrogen-fueled vehicles shall be provided with an approved mechanical ventilation system. The mechanical ventilation system shall be in accordance with Sections 502.16.1 and 502.16.2.</p> <p><b>Exception:</b> Where approved by the code official, natural ventilation shall be permitted in lieu of mechanical ventilation.</p> <p><b>[F] 502.16.1 Design.</b> Indoor locations shall be ventilated utilizing air supply inlets and exhaust outlets arranged to provide uniform air movement to the extent practical. Inlets shall be uniformly arranged on exterior walls near floor level. Outlets shall be located at the high point of the room in exterior walls or the roof.</p> <p>1. Ventilation shall be by a continuous mechanical ventilation system or by a mechanical ventilation system activated by a continuously monitoring natural gas detection system activating at a gas concentration of 25 percent of the LFL. In all cases, the system shall shut down the fueling system in the event of failure of the ventilation system.</p> <p>2. The ventilation rate shall be at least 1 cubic foot per minute per 12 cubic feet [0.00138m<sup>3</sup>/(s •m<sup>3</sup>)] of room volume.</p> <p><b>[F] 502.16.2 Operation.</b> The mechanical ventilation system shall operate continuously.</p> <p><b>Exceptions:</b></p> <p>1. Mechanical ventilation systems that are interlocked with a gas</p>	<p>No specific requirements in the 2003 UMC. §505.1 refers to the Building &amp; Fire Codes.</p> <p><b>2001 CBC §1202.2.1 General.</b> All enclosed portions of Group A, B, E, F, H, I, M and S Occupancies customarily occupied by human beings shall be provided with natural ventilation by means of openable exterior openings with an area not less than 1/20 of the total floor area or shall be provided with a mechanically operated ventilation system. Such exterior openings shall open directly onto a public way or a yard or court as set forth in Section 1203.4. Such mechanically operated ventilation system shall be capable of supplying a minimum of 15 cubic feet per minute (7 L/s) of outside air per occupant in all portions of the building during such time as the building is occupied. If the velocity of the air at a register exceeds 10 feet per second (3 m/s), the register shall be placed more than 8 feet (2438) above the floor directly beneath.</p> <p>...</p> <p><b>2001 CBC §1202.2.4 Group H, Division 4 Occupancies.</b> In all buildings classified as Group H, Division 4 Occupancies used for the repair or handling of motor vehicles operating under their own power, mechanical ventilation shall be provided capable of exhausting a minimum of 1 cubic foot per minute per square foot (0.044 L/s/m<sup>2</sup>) of floor area. Each engine repair stall shall be equipped with an exhaust pipe extension duct, extending to the outside of the building, which, if over 100 feet (3048 m) in length, shall mechanically exhaust 300 cubic feet per minute (141.6 L/s). Connecting offices and waiting rooms shall be supplied with conditioned air under positive pressure.</p> <p><b>EXCEPTION:</b> When approved, ventilating equipment may omitted in repair garages, enclosed heliports and aircraft hangars when well-distributed unobstructed openings to the outer air of sufficient</p>

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	<p>detection system designed in accordance with the <i>International Fire Code</i>.</p> <p>2. Mechanical ventilation systems in garages that are used only for the repair of vehicles fueled by liquid fuels or odorized gases, such as CNG, where the ventilation system is electrically interlocked with the lighting circuit.</p> <p><b>502.17 Tire rebuilding or recapping.</b> Each room where rubber cement is used or mixed, or where flammable or combustible solvents are applied, shall be ventilated in accordance with the applicable provisions of NFPA 91.</p> <p><b>502.17.1 Buffing machines.</b> Each buffing machine shall be connected to a dust-collecting system that prevents the accumulation of the dust produced by the buffing process.</p> <p><b>Committee Comments &amp; Action</b></p> <p><input checked="" type="checkbox"/> The requirements are equivalent.</p> <p>Discussion by the Committee:</p> <ul style="list-style-type: none"> <li>The sections preceded with [F]s are extracted from the IFC. As long as they are maintained in the IFC by the SFM, California has the provisions.</li> <li>§§502.17 and 502.17.1 are covered by §§505.0 and 505.1 in the UMC.</li> </ul> <p>The reference back to the Building Code in §505.1 is to the building code in effect for any jurisdiction.</p> <p>Discussion from the floor:</p> <ul style="list-style-type: none"> <li>CBSC asked if the reference back to the Building Code in §505.1 meant NFPA 5000 from the “C3” family of codes.</li> </ul> <p>Discussion by the Committee:</p> <ul style="list-style-type: none"> <li>The reference to the Building Code in §505.1 is to the building code in effect for any jurisdiction.</li> </ul> <p>Passed by a vote of six to one.</p>	<p>size to supply necessary ventilation are furnished.</p> <p>...</p> <p><b>2001 CBC §1202.2.6 Group S repair and storage garages and aircraft hangars.</b> In Group S, Division 3 repair garages and storage garages and in Division 5 aircraft hangars, the mechanical ventilation system required by Section 1202.2.1 may be omitted when, in the opinion of the building official, the building is supplied with unobstructed openings to the outer air that are sufficient to provide the necessary ventilation.</p>
<p><b>ITEM 5</b></p> <p><b>406.6 Repair garages.</b></p> <p><b>406.6.5 Heating equipment.</b></p> <p>Heating equipment shall be installed in accordance with the <i>International Mechanical Code</i></p>	<p><b>304.5 Public garages.</b> Appliances located in public garages, motor fuel-dispensing facilities, repair garages or other areas frequented by motor vehicles, shall be installed a minimum of 8 feet (2438 mm) above the floor. Where motor vehicles exceed 6 feet (1829 mm) in height and are capable of passing under an appliance, appliances shall be installed a minimum of 2 feet (610 mm) higher above the floor than the height of the tallest vehicle.</p> <p><b>Exception:</b> The requirements of this section shall not apply where the appliances are protected from motor vehicle impact and installed in accordance with Section 304.3 and NFPA 88B.</p>	<p><b>911.8.2 Repair Garages.</b> Gas utilization equipment installed in repair garages shall be installed in a detached building or room, separated from repair areas by walls or partitions, floors, or floor-ceiling assemblies that are constructed so as to prohibit the transmission of vapors and having a fire resistance rating of not less than 1 hour, and that have no openings in the wall separating the repair area within 8 ft. (2.4 m) of the floor. Wall penetrations shall be firestopped. Air for combustion purposes shall be obtained from outside the building. The heating room shall not be used for the storage of combustible materials.</p> <p><b>Exceptions:</b></p> <p>(1) Overhead heaters where installed not less than 8 ft. (2.4 m) above the floor shall be permitted.</p> <p>(2) Heating equipment for vehicle repair areas where there is no dispensing or transferring of Class I or Class II flammable or combustible liquids or liquefied petroleum gas shall be installed in accordance with NFPA 30A, Code for Motor Fuel Dispensing Facilities and Repair Garages.</p>

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	<b>Committee Comments &amp; Action</b> <input checked="" type="checkbox"/> The requirements are equivalent. Discussion by the Committee: None Discussion from the floor: None Passed by a unanimous vote.	
<b>ITEM 6</b> <b>409.3 Projection room and equipment ventilation.</b> Ventilation shall be provided in accordance with the <i>International Mechanical Code</i> .	<p><b>502.11 Motion picture projectors.</b> Motion picture projectors shall be exhausted in accordance with Section 502.11.1 or 502.11.2.</p> <p><b>502.11.1 Projectors with an exhaust discharge.</b> Projectors equipped with an exhaust discharge shall be directly connected to a mechanical exhaust system. The exhaust system shall operate at an exhaust rate as indicated by the manufacturer's installation instructions.</p> <p><b>502.11.2 Projectors without exhaust connection.</b> Projectors without an exhaust connection shall have contaminants exhausted through a mechanical exhaust system. The exhaust rate for electric arc projectors shall be a minimum of 200 cubic feet per minute (cfm) (0.09 m<sup>3</sup>/s) per lamp. The exhaust rate for xenon projectors shall be a minimum of 300 cfm (0.14 m<sup>3</sup>/s) per lamp. Xenon projector exhaust shall be at a rate such that the exterior temperature of the lamp housing does not exceed 130°F (54°C). The lamp and projection room exhaust systems, whether combined or independent, shall not be interconnected with any other exhaust or return system within the building.</p> <p><b>Committee Comments &amp; Action</b>  <input checked="" type="checkbox"/> The uniform code does not address requirements in the international code. What is missing from the uniform code:  Discussion by the Committee:  <ul style="list-style-type: none"> <li>These provisions came from the movie industry and are meant to protect equipment. There is no standard of care or energy requirement. Manufacturers' stipulated installation criteria will also provide guidelines.</li> <li>UMC lacks stipulated design criteria for exhaust of motion picture projectors.</li> </ul> Discussion from the floor:  <ul style="list-style-type: none"> <li>After recommendations are made by the committee, assume some amendments will be considered.</li> <li>Maybe the committee should recommend amendment with the CBC language which is shown above.</li> </ul> Discussion by the Committee:  <ul style="list-style-type: none"> <li>It is not the committee's task to go beyond this analysis of the IMC and UMC.</li> </ul> Passed by a unanimous vote. </p>	<p>No specific requirements in the 2003 UMC.</p> <p><b>2001 CBC §406.5.3.1 General.</b> Each projection machine shall be provided with an exhaust duct that will draw air from each lamp and exhaust it directly to the outside of the building in such a fashion that it will not be picked up by supply inlets. Such a duct shall be made of rigid materials, except for a continuous flexible connector approved for the purpose. The lamp exhaust system shall not be interconnected with any other system.</p> <p><b>2001 CBC §406.5.3.2 Electric arc projection equipment.</b> The exhaust capacity shall be 200 cubic feet per minute (94.4 L/s) for each lamp connected to the lamp exhaust system, or as recommended by the equipment manufacturer. Auxiliary air may be introduced into the system through a screened opening to stabilize the arc.</p> <p><b>2001 CBC §406.5.3.3 Xenon projection equipment.</b> The lamp exhaust system shall exhaust not less than 300 cubic feet per minute (142 L/s) per lamp or not less than that exhaust volume require or recommended by the equipment manufacturer, whichever is greater. The external temperature of the lamp housing shall not exceed 130°F (54.4°C) when operating.</p>
<b>ITEM 7</b> <b>412.4 Aircraft paint hangars.</b> <b>412.4.6 Ventilation.</b> Aircraft paint hangars shall be provided with	<b>IMC §[F]502.7</b> is not reprinted here. It is a duplication of excerpts from the IFC.	<p>No specific requirements in the 2003 UMC, but provisions are in the IFC.</p>

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ventilation as required in the <i>International Mechanical Code</i> .	<b>Committee Comments &amp; Action</b> <input checked="" type="checkbox"/> The uniform code does not address requirements in the international code. What is missing from the uniform code: Discussion by the Committee: <ul style="list-style-type: none"> <li>Missing provisions may be found in the IFC, to be coordinated with SFM.</li> <li>Per IAPMO, §505.1 covers product-conveying exhaust systems by performance criteria.</li> </ul> Discussion from the floor: None Passed by a vote of six to one.	
<b>ITEM 8</b> <b>414.1.2 Materials.</b> The safe design of hazardous material occupancies is material dependent. Individual material requirements are also found in Sections 307 and 415, and in the <i>International Mechanical Code</i> and the <i>International Fire Code</i> .	<b>IMC §[F]502.9</b> is not reprinted here. It is a duplication of excerpts from the IFC chapters on specific hazardous materials. However, there are references in those IFC sections back to the IMC.	No specific requirements in the 2003 UMC.
<b>ITEM 9</b> <b>414.3 Ventilation.</b> Rooms, areas or spaces of Group H in which explosive, corrosive, combustible, flammable or highly toxic dusts, mists, fumes, vapors or gases are or may be emitted due to the processing, use, handling or storage of materials shall be mechanically ventilated as required by the <i>International Fire Code</i> and the <i>International Mechanical Code</i> .	<b>Committee Comments &amp; Action</b> <input checked="" type="checkbox"/> The uniform code does not address requirements in the international code. What is missing from the uniform code: Discussion by the Committee: <ul style="list-style-type: none"> <li>Missing provisions may be found in the IFC, to be coordinated with SFM.</li> <li>Per IAPMO, §505.1 covers product-conveying exhaust systems by performance criteria.</li> </ul> Discussion from the floor: None Passed by a vote of six with one not voting.	
	<b>§510</b> and its tables, generally, address requirements for hazardous exhaust systems. Their lengths preclude their printing on this chart.  <b>510.5.7 Ducts.</b> Hazardous exhaust duct systems shall extend directly to the exterior of the building and shall not extend into or through ducts and plenums.	<b>2001 CBC §1202.2.3 Group H Occupancies.</b> Rooms, areas or spaces of Group H Occupancies in which explosive, corrosive, combustible, flammable or highly toxic dusts, mists, fumes, vapors or gases are or may be emitted due to the processing, use, handling or storage of materials shall be mechanically ventilated as required by the Fire Code and the Mechanical Code. Ducts conveying explosives or flammable vapors, fumes or dusts shall extend directly to the exterior of the building without entering other spaces. Exhaust ducts shall not extend into or through ducts or plenums. <b>EXCEPTION:</b> Ducts conveying vapor of fumes having flammable constituents less than 25 percent of their lower flammability limit may pass through other spaces. Emissions generated at work stations shall be confined to the area in which they are generated as specified in the Fire Code and the Mechanical Code. The location of supply and exhaust openings shall be in accordance with the Mechanical Code. Exhaust air contaminated by highly toxic material shall be treated in accordance with the Fire Code. <b>UMC 505.1 General.</b> A mechanical ventilation or exhaust system shall be installed to control, capture, and remove emissions generated from product use or handling when required by the Building Code or Fire Code and when such emissions result in a hazard to life or property. The design of the system shall be such that the emissions are confined to the area in which they are

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	<p><b>Committee Comments &amp; Action</b></p> <p><input checked="" type="checkbox"/> The requirements are equivalent.</p> <p>Discussion by the Committee:</p> <ul style="list-style-type: none"> <li>While it appears that the UMC is generally more performance-based than the IMC, performance-based is not always preferable.</li> <li>CBC §1202.2.3 is expendable. UMC §505.1 covers product-conveying exhaust systems by performance criteria.</li> <li>Mechanical engineers designing systems like to have design criteria in the mechanical code, not the fire code.</li> </ul> <p>Discussion from the floor:</p> <ul style="list-style-type: none"> <li>The committee was asked if it should make recommendations based on relative safety implied by the code sections.</li> </ul> <p>Discussion by the Committee:</p> <ul style="list-style-type: none"> <li>Safer, better, etc. are not judgments to be made by the committee.</li> </ul> <p>Passed by a unanimous vote.</p>	<p>generated by air currents, hoods, or enclosures and shall be exhausted by a duct system to a safe location or treated by removing contaminants. Ducts conveying explosives or flammable vapors, fumes, or dusts shall extend directly to the exterior of the building without entering other spaces. Exhaust ducts shall not extend into or through ducts and plenums.</p> <p><b>Exception:</b> Ducts conveying vapor or fumes having flammable constituents less than 25 percent of their lower flammability limit (LFL) may pass through other spaces.</p> <p><b>505.1.1</b> Incompatible materials shall not be conveyed in the same system.</p> <p><b>505.1.2</b> In systems conveying flammable vapors, gases, or mists, the concentration shall not exceed 25 percent of the lower flammability limit (LFL).</p> <p><b>Exception:</b> Higher concentrations shall be permitted if the exhaust system is designed and protected in accordance with the Standard on Explosion Prevention Systems in Chapter 17, using one or more of the following techniques:</p> <ul style="list-style-type: none"> <li>(a) Combustible concentration reduction</li> <li>(b) Oxidant concentration reduction</li> <li>(c) Deflagration suppression</li> <li>(d) Deflagration pressure containment</li> </ul> <p>Separate and distinct systems shall be provided for incompatible materials.</p> <p>Contaminated air shall not be recirculated to occupied areas unless contaminants have been removed. Air contaminated with explosive or flammable vapors, fumes, or dusts; flammable or toxic gases; or radioactive material shall not be recirculated.</p>
<p><b>ITEM 10</b>  <b>414.3 Ventilation.</b>  Emissions generated at workstations</p>	<p><b>[F] 502.10.1 Where required.</b> Exhaust ventilation systems shall be provided in the following locations in accordance with the requirements of this section and the <i>International Building Code</i>:</p>	<p><b>2001 CBC §1202.2.3 Group H Occupancies.</b>  . . . Emissions generated at work stations shall be confined to the area in which they are generated as specified in the Fire Code</p>

IBC Code Section	IMC Code Section	UMC Code Section
<p>shall be confined to the area in which they are generated as specified in the <i>International Fire Code</i> and the <i>International Mechanical Code</i>.</p> <p>The location of supply and exhaust openings shall be in accordance with the <i>International Mechanical Code</i>.</p>	<p>...</p> <p>2. Workstations: A ventilation system shall be provided to capture and exhaust fumes and vapors at workstations.</p> <p><b>510.5 Design.</b> Systems for removal of vapors, gases and smoke shall be designed by the constant velocity or equal friction methods. Systems conveying particulate matter shall be designed employing the constant velocity method.</p> <p><b>510.5.1 Balancing.</b> Systems conveying explosive or radioactive materials shall be prebalanced by duct sizing. Other systems shall be balanced by duct sizing with balancing devices, such as dampers. Dampers provided to balance air-flows shall be provided with securely fixed minimum-position blocking devices to prevent restricting flow below the required volume or velocity.</p> <p><b>510.5.2 Emission control.</b> The design of the system shall be such that the emissions are confined to the area in which they are generated by air currents, hoods or enclosures and shall be exhausted by a duct system to a safe location or treated by removing contaminants.</p> <p><b>510.5.3 Hoods required.</b> Hoods or enclosures shall be used where contaminants originate in a limited area of a space. The design of the hood or enclosure shall be such that air currents created by the exhaust systems will capture the contaminants and transport them directly to the exhaust duct.</p> <p><b>510.5.4 Contaminant capture and dilution.</b> The velocity and circulation of air in work areas shall be such that contaminants are captured by an airstream at the area where the emissions are generated and conveyed into a product-conveying duct system. Contaminated air from work areas where hazardous contaminants are generated shall be diluted below the thresholds specified in Section 510.2 with air that does not contain other hazardous contaminants.</p> <p><b>510.5.5 Makeup air.</b> Makeup air shall be provided at a rate approximately equal to the rate that air is exhausted by the hazardous exhaust system. Makeup-air intakes shall be located so as to avoid recirculation of contaminated air.</p> <p><b>510.5.6 Clearances.</b> The minimum clearance between hoods and combustible construction shall be the clearance required by the duct system.</p> <p><b>510.5.7 Ducts.</b> Hazardous exhaust duct systems shall extend directly to the exterior of the building and shall not extend into or through ducts and plenums.</p>	<p>and the Mechanical Code.</p> <p>See <b>UMC §505.1</b>, above</p> <p><b>505.2 Minimum Velocities and Circulation.</b> The velocity and circulation of air in work areas shall be such that contaminants are captured by an airstream at the area where the emissions are generated and conveyed into a product-conveying duct system. Mixtures within work areas where contaminants are generated shall be diluted below 25 percent of their lower explosive limit or lower flammability limit with air that does not contain other contaminants. The velocity of air within the duct shall be not less than set forth in Table 5-1.</p> <p>Systems for removal of vapors, gases, and smoke shall be designed by the constant velocity or equal friction methods. Systems conveying particulate matter shall be designed employing the constant velocity method. Systems conveying explosive or radioactive materials shall be prebalanced through duct sizing. Other systems may be designed with balancing devices such as dampers. Dampers provided to balance airflow shall be provided with securely fixed minimum-position blocking devices to prevent restricting flow below the required volume or velocity.</p> <p><b>505.3 Makeup Air.</b> Makeup air shall be provided to replenish air exhausted by the ventilation system. Makeup-air intakes shall be located so as to avoid recirculation of contaminated air within enclosures.</p> <p><b>505.4 Hoods and Enclosures.</b> Hoods and enclosures shall be used when contaminants originate in a concentrated area. The design of the hood or enclosure shall be such that air currents created by the exhaust systems will capture the contaminants and transport them directly to the exhaust duct. The volume of air shall be sufficient to dilute explosive or flammable vapors, fumes, or dusts as set forth in Section 505.2. Hoods of steel shall have a base metal thickness not less than 0.027 inch (0.69 mm) (No. 22 gage) for Class 1 and Class 5 metal duct systems; 0.033 inch (0.84 mm) (No. 20 gage) for hoods serving a Class 2 duct system; 0.044 inch (1.12 mm) (No. 18 gage) for hoods serving a Class 3 duct system; and 0.068 inch (1.73 mm) (No. 14 gage) for hoods serving a Class 4 duct system.</p> <p>Approved nonmetallic hoods and duct systems may be used for Class 5 corrosive systems when the corrosive mixture is nonflammable. Metal hoods used with Class 5 duct systems shall</p>

IBC Code Section	IMC Code Section	UMC Code Section
		be protected with suitable corrosion-resistant material. Edges of hoods shall be rounded. The minimum clearance between hoods and combustible construction shall be the clearance required by the duct system.
	<b>Committee Comments &amp; Action</b> <input checked="" type="checkbox"/> The requirements are equivalent. Discussion by the Committee: None Discussion from the floor: None Passed by a unanimous vote.	
<b>ITEM 11</b> <b>415.7.1.4 Explosion control.</b> Explosion control shall be provided as specified in the <i>International Fire Code</i> , or spaces shall be equipped with the equivalent mechanical ventilation complying with the <i>International Mechanical Code</i> .	<b>510.8.3 Explosion relief.</b> Systems exhausting potentially explosive mixtures shall be protected with an approved explosion relief system or by an approved explosion prevention system designed and installed in accordance with NFPA 69. An explosion relief system shall be designed to minimize the structural and mechanical damage resulting from an explosion or deflagration within the exhaust system. An explosion prevention system shall be designed to prevent an explosion or deflagration from occurring.	<b>506.4 Explosion Venting.</b> Ducts conveying explosive dusts shall have explosion vents, openings protected by antiflashback swing valves or rupture diaphragms. Openings to relieve explosive forces shall be located outside the building. When relief devices cannot provide sufficient pressure relief, ductwork shall be designed to withstand an internal pressure of not less than 100 pounds per square inch (689 kPa). If a room or building contains a dust explosion hazard that is external to protected equipment, as defined in 2.2.3.1 of NFPA 654, such areas shall be provided with deflagration venting to a safe outside location.
	<b>Committee Comments &amp; Action</b> <input checked="" type="checkbox"/> The requirements are equivalent. Discussion by the Committee: <ul style="list-style-type: none"> <li>In this case, the IMC is more performance-based. This may mean a higher threshold, but not necessarily. Performance-based and prescriptive provisions can be considered equivalent.</li> </ul> Discussion from the floor: <ul style="list-style-type: none"> <li>When asked by the committee, CBSC indicated that references to NFPA or other national standards are not a problem as long as they are in adopted model codes.</li> <li>Equivalent means achieving the same ends.</li> </ul> Passed by a unanimous vote.	
<b>ITEM 12</b> <b>415.7.2 Flammable and combustible liquids.</b> The storage, handling, processing and transporting of flammable and combustible liquids shall be in accordance with the <i>International Mechanical Code</i> and the <i>International Fire Code</i> .	<b>IMC §[F]502.9.5</b> is not reprinted here. It is a duplication of excerpts from the IFC chapters on specific flammable and combustible liquids. However, there are references in those IFC sections back to the IMC.	No specific requirements in the 2003 UMC. General statement in §505.1.
	<b>Committee Comments &amp; Action</b> <input checked="" type="checkbox"/> The uniform code does not address requirements in the international code. What is missing from the uniform code: Discussion by the Committee: <ul style="list-style-type: none"> <li>UMC §505.1 makes reference to Building Code and Fire Code. Much discussion ensued concerning the implications of equivalency by reference. The provisions are missing from the UMC, but equivalent by reference to the Fire Code.</li> <li>UMC §§1105.3 and 1121.0, and maybe other §§, are provisions for storage of refrigerants.</li> <li>Uniform Building and Fire Codes used to contain specific requirements for air movement in various types of spaces. They</li> </ul>	

IBC Code Section	IMC Code Section	UMC Code Section
	<p>were moved into the IMC. Those in the IFC should be applicable in California if SFM adopts the IFC as proposed.</p> <ul style="list-style-type: none"> <li>Proposed for the 2006 UMC are performance-based ventilation requirements based on ASHRAE 62.</li> </ul> <p>Discussion from the floor:</p> <ul style="list-style-type: none"> <li>Proposed for adoption in the current code cycle, the 2003 CMC may not be published, because the 2006 UMC will be out before the publication date for the 2003 CMC.</li> <li>If a provision can be found through a reference, it is not “missing” from the code.</li> </ul> <p>Passed by a unanimous vote.</p>	
<p><b>ITEM 13</b>  <b>415.7.2.8 Room ventilation.</b>  Storage tank areas storing Class I, II or IIIA liquids shall be provided with mechanical ventilation. The mechanical ventilation system shall be in accordance with the <i>International Mechanical Code</i> and the <i>International Fire Code</i>.</p>	<p><b>[F] 502.9.5.1 Vaults.</b> Vaults that contain tanks of Class I liquids shall be provided with continuous ventilation at a rate of not less than 1 cfm/ft<sup>2</sup> of floor area [0.00508m<sup>3</sup>/(s • m<sup>2</sup>)], but not less than 150 cfm (4 m<sup>3</sup>/min). Failure of the exhaust airflow shall automatically shut down the dispensing system. The exhaust system shall be designed to provide air movement across all parts of the vault floor. Supply and exhaust ducts shall extend to a point not greater than 12 inches (305 mm) and not less than 3 inches (76 mm) above the floor. The exhaust system shall be installed in accordance with the provisions of NFPA 91. Means shall be provided to automatically detect any flammable vapors and to automatically shut down the dispensing system upon detection of such flammable vapors in the exhaust duct at a concentration of 25 percent of the LFL.  [This § is paraphrased from IFC §3404.2.8.9, which refers to the IMC for installation of the exhaust system.]</p> <p><b>Committee Comments &amp; Action</b></p> <p><input checked="" type="checkbox"/> The uniform code does not address requirements in the international code. What is missing from the uniform code:</p> <p>Discussion by the Committee:</p> <ul style="list-style-type: none"> <li>Reference to the IFC is missing. IAPMO will study to see if §505.0 or another section may apply.</li> <li>Delete reference to the IMC in IBC §415.7.2.8, and leave reference to the IFC only.</li> </ul> <p>Discussion from the floor:</p> <ul style="list-style-type: none"> <li>CBSC asked the ICC representative if sections are duplicated in the IBC and IFC.</li> </ul> <p>Discussion by the Committee:</p> <ul style="list-style-type: none"> <li>ICC's representative answered in the affirmative.</li> </ul> <p>Passed by a unanimous vote.</p>	<p>No requirement in the 2003 UMC.</p>
<p><b>ITEM 14</b>  <b>415.7.3 Liquefied petroleum gas-distribution facilities.</b>  The design and construction of propane, butane, propylene, butylene and other liquefied petroleum gas-distribution facilities shall conform to the applicable provisions of Sections 415.7.3.1 through 415.7.3.5.2. The storage</p>	<p><b>[F] 502.9.10 LP-gas distribution facilities.</b> LP-gas distribution facilities shall be ventilated in accordance with NFPA 58.  <b>[F] 502.9.10.1 Portable container use.</b> Above-grade underfloor spaces or basements in which portable LP-gas containers are used or are stored awaiting use or re-sale shall be provided with an approved means of ventilation.  <b>Exception:</b> Department of Transportation (DOT) specification cylinders with a maximum water capacity of 2.5 pounds (1 kg) for use in completely self-contained hand torches and similar applications. The quantity of LP-gas shall not exceed 20 pounds</p>	<p><b>1313.0 Liquefied Petroleum Gas Facilities and Piping.</b> Liquefied petroleum gas facilities shall comply with NFPA 58, Liquefied Petroleum Gas Code.  <b>304.6 Liquefied Petroleum Gas Facilities.</b> Containers, container valves regulating equipment, and appurtenances for the storage and supply of liquefied petroleum gas shall be installed in accordance with the Fire Code.</p>

IBC Code Section	IMC Code Section	UMC Code Section
<p>and handling of liquefied petroleum gas systems shall conform to the <i>International Fire Code</i>. The design and installation of piping, equipment and systems that utilize liquefied petroleum gas shall be in accordance with the <i>International Fuel Gas Code</i>. Liquefied petroleum gas-distribution facilities shall be ventilated in accordance with the <i>International Mechanical Code</i> and Section 415.7.3.1.</p>	<p>(9 kg). [This § is paraphrased from IFC §3809.7, which makes <u>no</u> reference back to the IMC.]</p> <p><b>Committee Comments &amp; Action</b></p> <p><input checked="" type="checkbox"/> The requirements are equivalent. Discussion by the Committee: None Discussion from the floor: None Passed by a unanimous vote.</p>	<p>[This §, complete with the exception, is in 2001 UFC §8212.7. IFC §3809.7, thus appears not to deviate from current CA codes.]</p>
<p><b>ITEM 15</b> <b>415.7.4 Dry cleaning plants.</b> The construction and installation of dry cleaning plants shall be in accordance with the requirements of this code, the <i>International Mechanical Code</i>, the <i>International Plumbing Code</i> and NFPA 32. Dry cleaning solvents and systems shall be classified in accordance with the <i>International Fire Code</i>.</p>	<p><b>[F] 502.6 Dry cleaning plants.</b> Ventilation in dry cleaning plants shall be adequate to protect employees and the public in accordance with this section and DOL 29 CFR Part 1910.1000, where applicable.</p> <p><b>[F] 502.6.1 Type II systems.</b> Type II dry cleaning systems shall be provided with a mechanical ventilation system that is designed to exhaust 1 cubic foot of air per minute for each square foot of floor area (1 cfm/ft<sup>2</sup>) [0.00508 m<sup>3</sup>/(s • m<sup>2</sup>)] in dry cleaning rooms and in drying rooms. The ventilation system shall operate automatically when the dry cleaning equipment is in operation and shall have manual controls at an approved location.</p> <p><b>[F] 502.6.2 Type IV and V systems.</b> Type IV and V dry cleaning systems shall be provided with an automatically activated exhaust ventilation system to maintain a minimum of 100 feet per minute (0.5 m/s) air velocity through the loading door when the door is opened.</p> <p><b>Exception:</b> Dry cleaning units are not required to be provided with exhaust ventilation where an exhaust hood is installed immediately outside of and above the loading door which operates at an airflow rate as follows:</p> <p style="text-align: right;"><b>(Equation 5-1)</b></p> <p><math>Q = 100 \times ALD</math></p> <p>where: Q = Flow rate exhausted through the hood, cubic feet per minute. ALD = Area of the loading door, square feet.</p> <p><b>[F] 502.6.3 Spotting and pretreating.</b> Scrubbing tubs, scouring, brushing or spotting operations shall be located such that solvent vapors are captured and exhausted by the ventilating system. [These §§ are paraphrased from IFC §§1204.2.1, 1205.2.3, 1205.3, and 1206.3.3, respectively. Only IFC §1204.2.1 refers back to the IMC.]</p>	<p>No specific requirements in the 2003 UMC.</p>

IBC Code Section	IMC Code Section	UMC Code Section
	<p><b>Committee Comments &amp; Action</b></p> <p><input checked="" type="checkbox"/> The uniform code does not address requirements in the international code. What is missing from the uniform code:</p> <p>Discussion by the Committee:</p> <ul style="list-style-type: none"> <li>While mechanical engineers prefer to see exhaust ventilation systems in the mechanical code, they are applicable if the IFC is adopted.</li> <li>The UMC does not address the IMC provisions, but they are in the IFC.</li> </ul> <p>Discussion from the floor:</p> <ul style="list-style-type: none"> <li>CBSC staff cautioned the committee against recommending reference changes in the IBC at this time. It is for the state agencies to determine how the provisions identified by the committee will be captured.</li> </ul> <p>Passed by a unanimous vote.</p>	
<p><b>ITEM 16</b>  <b>415.9.11.1 General.</b> Automatic fire sprinkler system protection shall be provided in exhaust ducts conveying vapors, fumes, mists or dusts generated from HPM in accordance with this section and the <i>International Mechanical Code</i>.</p>	<p><b>510.7 Suppression required.</b> Ducts shall be protected with an approved automatic fire suppression system installed in accordance with the <i>International Building Code</i>.</p> <p><b>Exceptions:</b></p> <ol style="list-style-type: none"> <li>1. An approved automatic fire suppression system shall not be required in ducts conveying materials, fumes, mists and vapors that are nonflammable and noncombustible under all conditions and at any concentrations.</li> <li>2. An approved automatic fire suppression system shall not be required in ducts where the largest cross-sectional diameter of the duct is less than 10 inches (254 mm).</li> </ol>	<p><b>506.6 Fire Protection.</b> Sprinklers or other fire-protection devices shall be installed within ducts having a cross-sectional dimension exceeding ten (10) inches (254 mm) when the duct conveys flammable vapors or fumes. Sprinklers shall be installed at twelve (12) foot (3658 mm) intervals in horizontal ducts and at changes in direction. In vertical runs, sprinklers shall be installed at the top and at alternate floor levels.</p>
	<p><b>Committee Comments &amp; Action</b></p> <p><input checked="" type="checkbox"/> The requirements are equivalent.</p> <p>Discussion by the Committee: None</p> <p>Discussion from the floor: None</p> <p>Passed by a unanimous vote.</p>	
<p><b>ITEM 17</b>  <b>416.3 Spraying spaces.</b> Spraying spaces shall be ventilated with an exhaust system to prevent the accumulation of flammable mist or vapors in accordance with the <i>International Mechanical Code</i>. Where such spaces are not separately enclosed, noncombustible spray curtains shall be provided to restrict the spread of flammable vapors.</p>	<p><b>IMC §[F]502.7</b> is not reprinted here. It is paraphrased from IFC §§1405.2, 1504.1.4, and 1504.2. However, there are references in those IFC sections back to the IMC.</p>	<p>The following §§s deal with velocities and duct termination. No other requirements in the 2003 UMC.</p> <p><b>505.2 Minimum Velocities and Circulation.</b> The velocity and circulation of air in work areas shall be such that contaminants are captured by an airstream at the area where the emissions are generated and conveyed into a product-conveying duct system. Mixtures within work areas where contaminants are generated shall be diluted below 25 percent of their lower explosive limit or lower flammability limit with air that does not contain other contaminants. The velocity of air within the duct shall be not less than set forth in Table 5-1.</p> <p>Systems for removal of vapors, gases, and smoke shall be designed by the constant velocity or equal friction methods. Systems conveying particulate matter shall be designed employing the constant velocity method. Systems conveying explosive or radioactive materials shall be prebalanced through duct sizing. Other systems may be designed with balancing</p>

IBC Code Section	IMC Code Section	UMC Code Section
		<p>devices such as dampers. Dampers provided to balance airflow shall be provided with securely fixed minimum-position blocking devices to prevent restricting flow below the required volume or velocity.</p> <p><b>506.9 Exhaust Outlets.</b> Outlets for exhausts that exceed 600°F (315°C) shall be in accordance with Table 5-7. The termination point for exhaust ducts discharging to the atmosphere shall be not less than the following:</p> <p><b>506.9.1</b> Ducts conveying explosive or flammable vapors, fumes, or dusts: thirty (30) feet (9144 mm) from property line; ten (10) feet (3048 mm) from openings into the building; six (6) feet (1829 mm) from exterior walls or roofs; thirty (30) feet (9144 mm) from combustible walls or openings into the building which are in the direction of the exhaust discharge; ten (10) feet (3048 mm) above adjoining grade.</p> <p><b>506.9.2</b> Other product-conveying outlets: ten (10) feet (3048 mm) from property line; three (3) feet (914 mm) from exterior wall or roof; ten (10) feet (3048 mm) from openings into the building; ten (10) feet (3048 mm) above adjoining grade.</p>
	<p><b>Committee Comments &amp; Action</b></p> <p><input checked="" type="checkbox"/> The requirements are equivalent.</p> <p>Discussion by the Committee:</p> <ul style="list-style-type: none"> <li>Provisions in the IMC are in the IFC. The UMC has all of the same requirements.</li> </ul> <p>Discussion from the floor:</p> <ul style="list-style-type: none"> <li>CBSC staff asked if the sections cited in the UMC column addressed recirculation.</li> </ul> <p>Discussion by the Committee:</p> <ul style="list-style-type: none"> <li>UMC §505.1 should be added to the UMC column: It makes reference to the Fire Code and contains a similar prohibition against recirculation of contaminated air.</li> </ul> <p>Passed by a unanimous vote.</p>	
<p><b>ITEM 18</b>  <b>SECTION 603</b>  <b>COMBUSTIBLE MATERIAL IN TYPE I AND II CONSTRUCTION</b>  <b>603.1 Allowable materials.</b>  22. Materials exposed within plenums complying with Section 602 of the <i>International Mechanical Code</i>.</p>	<p><b>602.2.1 Materials exposed within plenums.</b> Except as required by Sections 602.2.1.1 through 602.2.1.5, materials exposed within plenums shall be noncombustible or shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84.</p> <p><b>Exceptions:</b></p> <ol style="list-style-type: none"> <li>1. Rigid and flexible ducts and connectors shall conform to Section 603.</li> <li>2. Duct coverings, linings, tape and connectors shall conform to Sections 603 and 604.</li> <li>3. This section shall not apply to materials exposed within plenums in one- and two-family dwellings.</li> <li>4. This section shall not apply to smoke detectors.</li> <li>5. Combustible materials enclosed in approved gypsum board</li> </ol>	<p><b>602.2 Combustibles within Ducts or Plenums.</b> Materials exposed within ducts or plenums shall have a flame-spread index of not more than 25 and a smoke-developed rating index of not more than 50 when tested as a composite product in accordance with ASTM E84 or ANSI/UL 723, Standard for Test for Surface Burning Characteristics of Building Materials, or as a composite product in accordance with NFPA 255 Standard Method of Test of Surface Burning Characteristics of Building Materials, ASTM E 84-2001 or ANSI/UL 723-96.:</p> <p><b>Exceptions:</b></p> <ol style="list-style-type: none"> <li>(1) Return-air and outside-air ducts, plenums, or concealed spaces that serve a dwelling unit shall be permitted to be of combustible construction.</li> <li>(2) Air filters meeting the requirements of Sections 312.0 and</li> </ol>

IBC Code Section	IMC Code Section	UMC Code Section
	<p>assemblies or enclosed in materials listed and labeled for such application.</p> <p><b>602.2.1.1 Wiring.</b> Combustible electrical or electronic wiring methods and materials, optical fiber cable, and optical fiber raceway exposed within a plenum shall have a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread not greater than 5 feet (1524 mm) when tested in accordance with NFPA 262. Only type OFNP (plenum rated nonconductive optical fiber cable) shall be installed in plenum-rated optical fiber raceways. Wiring, cable, and raceways addressed in this section shall be listed and labeled as plenum rated and shall be installed in accordance with ICC <i>Electrical Code</i>.</p> <p><b>602.2.1.2 Fire sprinkler piping.</b> Plastic fire sprinkler piping exposed within a plenum shall be used only in wet pipe systems and shall have a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread of not greater than 5 feet (1524 mm) when tested in accordance with UL 1887. Piping shall be listed and labeled.</p> <p><b>602.2.1.3 Pneumatic tubing.</b> Combustible pneumatic tubing exposed within a plenum shall have a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread of not greater than 5 feet (1524 mm) when tested in accordance with UL 1820. Combustible pneumatic tubing shall be listed and labeled.</p> <p><b>602.2.1.4 Combustible electrical equipment.</b> Combustible electrical equipment exposed within a plenum shall have a peak rate of heat release not greater than 100 kilowatts, a peak optical density not greater than 0.50 and an average optical density not greater than 0.15 when tested in accordance with UL 2043. Combustible electrical equipment shall be listed and labeled.</p> <p><b>602.2.1.5 Foam plastic insulation.</b> Foam plastic insulation used as wall or ceiling finish in plenums shall exhibit a flame spread index of 75 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E 84 and shall also comply with Section 602.2.1.5.1, 602.2.1.5.2 or 602.2.1.5.3.</p> <p><b>602.2.1.5.1 Separation required.</b> The foam plastic insulation shall be separated from the plenum by a thermal barrier complying with Section 2603.4 of the <i>International Building Code</i>.</p> <p><b>602.2.1.5.2 Approval.</b> The foam plastic insulation shall be approved based on tests conducted in accordance with Section 2603.8 of the <i>International Building Code</i>.</p> <p><b>602.2.1.5.3 Covering.</b> The foam plastic insulation shall be covered by corrosion-resistant steel having a base metal</p>	<p>503.3.</p> <p>(3) Water evaporation media in an evaporative cooler.</p> <p>(4) Charcoal filters when protected with an approved fire suppression system.</p> <p>(5) Electrical wiring in plenums shall comply with NFPA 70, National Electrical Code. Flame propagation and smoke production characteristics of exposed electric cables installed in concealed space used as air plenums shall:</p> <p>(a) Exhibit a flame travel of five (5) feet (1524 mm) or less, and</p> <p>(b) Produce smoke having an average optical density not greater than 0.15 and having a peak optical density of 0.5 or less when tested in accordance with NFPA 262, Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.</p> <p>(c) Wiring meeting these requirements shall be listed and labeled as plenum cable as required by the National Electrical Code.</p> <p>(6) Nonmetallic fire sprinkler piping in plenums shall be listed and shall meet the following requirements:</p> <p>(a) Exhibit flame travel of five (5) feet (1524 mm) or less, and</p> <p>(b) Produce smoke having an average optical density not greater than 0.15 and having a peak optical density of 0.5 or less when tested in accordance with UL 1887, Standard for Fire Test of Plastic Sprinkler Pipe for Flame and Smoke Characteristics.</p> <p>(7) Nonmetallic pneumatic tubing in plenums shall be listed and shall meet the following requirements:</p> <p>(a) Exhibit flame travel of five (5) feet (1524 mm) or less, and</p> <p>(b) Produce smoke having an average optical density not greater than 0.15 and having a peak optical density of 0.5 or less when tested in accordance with UL 1820, Standard for Fire Test of Pneumatic Tubing for Flame and Smoke Characteristics.</p> <p>(8) Loudspeakers and recessed luminaries, including their assemblies and accessories, in plenums shall be listed and shall meet the following requirements:</p> <p>(a) Have a peak rate of heat release not greater than 100 kilowatts.</p> <p>(b) Produce smoke having an average optical density not greater than 0.15 and having a peak optical density of 0.5 or less when tested in accordance with UL 2043, Standard for Fire Test for Heat and Visible Smoke Release of Discrete Products and Their Accessories Installed in Air-Handling Spaces.</p> <p>(9) Smoke detectors.</p>

IBC Code Section	IMC Code Section	UMC Code Section
	<p>thickness of not less than 0.0160 inch (0.4 mm).</p> <p><b>Committee Comments &amp; Action</b></p> <p><input checked="" type="checkbox"/> The requirements are equivalent.</p> <p>Discussion by the Committee:</p> <ul style="list-style-type: none"> <li>• UMC provisions are broader than those in the IMC.</li> <li>• IAPMO advocates evaluation of provisions in the UMC without comparison to the IMC.</li> </ul> <p>Discussion from the floor:</p> <ul style="list-style-type: none"> <li>• Asked if California was adopting the 2003 UMC, and why the committee was looking at provisions in the IMC.</li> </ul> <p>Discussion by the Committee:</p> <ul style="list-style-type: none"> <li>• Explained to the audience that, as earlier discussed, the 2003 UMC may not get published as the CMC because the 2006 UMC will already be available. The IMC sections are referenced in the IBC and may contain provisions not in the UMC.</li> </ul> <p>Passed by a unanimous vote.</p>	
<p><b>ITEM 19</b></p> <p><b>603.1.1 Ducts.</b> The use of nonmetallic ducts shall be permitted when installed in accordance with the limitations of the <i>International Mechanical Code</i>.</p>	<p><b>603.5 Nonmetallic ducts.</b> Nonmetallic ducts shall be constructed with Class 0 or Class 1 duct material in accordance with UL 181. Fibrous duct construction shall conform to the SMACNA <i>Fibrous Glass Duct Construction Standards</i> or NAIMA <i>Fibrous Glass Duct Construction Standards</i>. The maximum air temperature within nonmetallic ducts shall not exceed 250_F (121_C).</p> <p><b>603.5.1 Gypsum ducts.</b> The use of gypsum boards to form air shafts (ducts) shall be limited to return air systems where the air temperatures do not exceed 125_F (52_C) and the gypsum board surface temperature is maintained above the airstream dew-point temperature. Air ducts formed by gypsum boards shall not be incorporated in air-handling systems utilizing evaporative coolers.</p> <p><b>603.6 Flexible air ducts and flexible air connectors.</b> Flexible air ducts, both metallic and nonmetallic, shall comply with Sections 603.6.1, 603.6.1.1, 603.6.3 and 603.6.4. Flexible air connectors, both metallic and nonmetallic, shall comply with Sections 606.6.2 through 603.6.4.</p> <p><b>603.6.1 Flexible air ducts.</b> Flexible air ducts, both metallic and nonmetallic, shall be tested in accordance with UL 181. Such ducts shall be listed and labeled as Class 0 or Class 1 flexible air ducts and shall be installed in accordance with Section 304.1.</p> <p><b>603.6.1.1 Duct length.</b> Flexible air ducts shall not be limited in length.</p> <p><b>603.6.2 Flexible air connectors.</b> Flexible air connectors, both metallic and nonmetallic, shall be tested in accordance with UL 181. Such connectors shall be listed and labeled as Class 0 or Class 1 flexible air connectors and shall be installed in accordance with Section 304.1.</p> <p><b>603.6.2.1 Connector length.</b> Flexible air connectors shall be limited in length to 14 feet (4267 mm).</p> <p><b>603.6.2.2 Connector penetration limitations.</b> Flexible air</p>	<p><b>506.1 Materials.</b> Materials used in product-conveying duct systems shall be suitable for the intended use and shall be of metal.</p> <p><b>Exceptions:</b></p> <p>(1) Asbestos-cement, concrete, clay, or ceramic materials may be used when it is shown that these materials will be equivalent to metal ducts installed in accordance with this chapter.</p> <p>(2) Ducts serving a Class 5 system may be constructed of approved nonmetallic material when the corrosive characteristics of the material being conveyed make a metal system unsuitable and when the mixture being conveyed is nonflammable. Approved nonmetallic material shall be either a listed product having a flame-spread index of twenty-five (25) or less and a smoke-developed rating of fifty (50) or less on both inside and outside surfaces without evidence of continued progressive combustion, or shall have a flame-spread index of twenty-five (25) or less and shall be installed with an automatic fire-sprinkler protection system inside the duct.</p> <p>(3) Ducts used in central vacuum cleaning systems within a dwelling unit may be of PVC pipe. Penetrations of fire walls or floor-ceiling or roof-ceiling assemblies shall comply with the Building Code. Copper or ferrous pipes or conduits extending from within the separation between a garage and dwelling unit to the central vacuuming unit may be used.</p> <p><b>602.3 Factory-Made Air Ducts.</b> Factory-made air ducts shall be approved for the use intended or shall conform to the requirements of the referenced standard for air ducts in Chapter 17, Part II. Each portion of a factory-made air duct system shall be identified by the manufacturer with a label or other suitable identification indicating compliance with the referenced standard for air ducts in Chapter 17, Part II, and its class designation.</p>

IBC Code Section	IMC Code Section	UMC Code Section
	<p>connectors shall not pass through any wall, floor or ceiling.</p> <p><b>603.6.3 Air temperature.</b> The design temperature of air to be conveyed in flexible air ducts and flexible air connectors shall be less than 250°F (121°C).</p> <p><b>603.6.4 Flexible air duct and air connector clearance.</b> Flexible air ducts and air connectors shall be installed with a minimum clearance to an appliance as specified in the appliance manufacturer's installation instructions.</p>	<p>These ducts shall be listed and shall be installed in accordance with the terms of their listing and the requirements of UMC Standard No. 6-5. Flexible air connectors are not permitted.</p> <p><b>604.2 Factory-Made Air Ducts.</b> Listed Class 0 or Class 1 factory-made air ducts may be installed in any occupancy covered by this code.</p> <p>Factory-made air ducts shall not be used for vertical risers in air-duct systems serving more than two stories. Such ducts shall not penetrate construction where fire dampers are required.</p> <p>Factory-made air ducts shall be installed with at least four (4) inches (102 mm) of separation from earth, except when installed as a liner inside of concrete, tile, or metal pipe; they shall be protected from physical damage.</p> <p>The temperature of the air to be conveyed in any of these classes of ducts shall not exceed 250°F (122°C).</p>
<p><b>ITEM 20</b></p> <p><b>603.1.2 Piping.</b> The use of combustible piping materials shall be permitted when installed in accordance with the limitations of the <i>International Mechanical Code</i> and the <i>International Plumbing Code</i>.</p>	<p><b>602.2.1.2 Fire sprinkler piping.</b> Plastic fire sprinkler piping exposed within a plenum shall be used only in wet pipe systems and shall have a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread of not greater than 5 feet (1524 mm) when tested in accordance with UL 1887. Piping shall be listed and labeled.</p> <p><b>602.2.1.3 Pneumatic tubing.</b> Combustible pneumatic tubing exposed within a plenum shall have a peak optical density not greater than 0.50, an average optical density not greater than 0.15, and a flame spread of not greater than 5 feet (1524 mm) when tested in accordance with UL 1820. Combustible pneumatic tubing shall be listed and labeled.</p>	<p><b>602.2 Combustibles within Ducts or Plenums.</b></p> <p>...</p> <p>(6) Nonmetallic fire sprinkler piping in plenums shall be listed and shall meet the following requirements:</p> <p>(a) Exhibit flame travel of five (5) feet (1524 mm) or less, and</p> <p>(b) Produce smoke having an average optical density not greater than 0.15 and having a peak optical density of 0.5 or less when tested in accordance with UL 1887, Standard for Fire Test of Plastic Sprinkler Pipe for Flame and Smoke Characteristics.</p> <p>(7) Nonmetallic pneumatic tubing in plenums shall be listed and shall meet the following requirements:</p> <p>(a) Exhibit flame travel of five (5) feet (1524 mm) or less, and</p> <p>(b) Produce smoke having an average optical density not greater than 0.15 and having a peak optical density of 0.5 or less when tested in accordance with UL 1820, Standard for Fire Test of Pneumatic Tubing for Flame and Smoke Characteristics.</p>
<p><b>ITEM 21</b></p> <p><b>SECTION 707</b></p>	<p><b>506.3.10 Grease duct enclosure.</b> A grease duct serving a Type I hood that penetrates a ceiling, wall or floor shall be enclosed from</p>	<p><b>510.7 Interior Installations.</b></p> <p><b>510.7.1</b> In all buildings more than one story in height, and in one-</p>

IBC Code Section	IMC Code Section	UMC Code Section
<p><b>SHAFT ENCLOSURES</b>  <b>707.2 Shaft enclosure required.</b>  Openings through a floor/ceiling assembly shall be protected by a shaft enclosure complying with this section.</p> <p><b>Exceptions:</b>  4. A shaft enclosure is not required for penetrations by ducts protected in accordance with Section 712.4. Grease ducts shall be protected in accordance with the <i>International Mechanical Code</i>.</p>	<p>the point of penetration to the outlet terminal. A duct shall penetrate exterior walls only at locations where unprotected openings are permitted by the <i>International Building Code</i>. Ducts shall be enclosed in accordance with the <i>International Building Code</i> requirements for shaft construction. The duct enclosure shall be sealed around the duct at the point of penetration and vented to the outside of the building through the use of weather-protected openings. Clearance from the duct to the interior surface of enclosures of combustible construction shall be not less than 18 inches (457 mm). Clearance from the duct to the interior surface of enclosures of noncombustible construction or gypsum wallboard attached to noncombustible structures shall be not less than 6 inches (152 mm). The duct enclosure shall serve a single grease exhaust duct system and shall not contain any other ducts, piping, wiring or systems.</p> <p><b>Exceptions:</b>  1. The shaft enclosure provisions of this section shall not be required where a duct penetration is protected with a through-penetration firestop system classified in accordance with ASTM E 814 and having an "F" and "T" rating equal to the fire-resistance rating of the assembly being penetrated and where the surface of the duct is continuously covered on all sides from the point at which the duct penetrates a ceiling, wall or floor to the outlet terminal with a classified and labeled material, system, method of construction or product specifically evaluated for such purpose, in accordance with a nationally recognized standard for such enclosure materials. Exposed duct wrap systems shall be protected where subject to physical damage.  2. A duct enclosure shall not be required for a grease duct that penetrates only a nonfire-resistance-rated roof/ceiling assembly.</p>	<p>story buildings where the roof-ceiling assembly is required to have a fire resistance rating, the ducts shall be enclosed in a continuous enclosure extending from the lowest fire-rated ceiling or floor above the hood, through any concealed spaces, to or through the roof so as to maintain the integrity of the fire separations required by the applicable building code provisions. The enclosure shall be sealed around the duct at the point of penetration of the lowest fire-rated ceiling or floor above the hood in order to maintain the fire resistance rating of the enclosure and shall be vented to the exterior of the building through weather-protected openings.</p> <p><b>Exception:</b> The continuous enclosure provisions shall not be required where a field-applied grease duct enclosure or a factory-built grease duct enclosure (see Section 507.2.3) is protected with a listed duct through-penetration protection system equivalent to the fire resistance rating of the assembly being penetrated, and the materials are installed in accordance with the conditions of their listings and the manufacturers' instructions and are acceptable to the Authority Having Jurisdiction.</p> <p><b>510.7.2</b> The enclosure required in Section 510.7.1 shall conform to Sections 510.7.2.1 through 510.7.2.3.</p> <p><b>510.7.2.1</b> If the building is less than four stories in height, the enclosure wall shall have a fire resistance rating of not less than 1 hour.</p> <p><b>510.7.2.2</b> If the building is four stories or more in height, the enclosure wall shall have a fire resistance rating of not less than 2 hours.</p> <p><b>510.7.2.3</b> Clearance from the duct or the exhaust fan to the interior surface of enclosures of combustible construction shall be not less than 18 in. (457.2 mm), and clearance from the duct to the interior surface of enclosures of noncombustible or limited-combustible construction shall be not less than 6 in. (152.4 mm). Provisions for reducing clearances as described in Section 507.2 are not applicable to enclosures.</p> <p><b>Exception:</b> Clearance from the outer surfaces of field-applied grease duct enclosures and factory-built grease duct enclosures to the interior surfaces of construction installed around them shall be permitted to be reduced where the field-applied grease duct enclosure materials and factory-built grease duct enclosures are installed in accordance with the conditions of their listings and manufacturers' instructions and are acceptable to the Authority Having Jurisdiction.</p> <p><b>510.7.3</b> For field-applied grease duct enclosures and factory-built grease duct enclosures, the materials and products shall conform</p>

IBC Code Section	IMC Code Section	UMC Code Section
	<p data-bbox="602 1101 968 1127"><b>Committee Comments &amp; Action</b></p> <p data-bbox="602 1130 1058 1162"><input checked="" type="checkbox"/> The requirements are equivalent.</p> <p data-bbox="602 1166 926 1192">Discussion by the Committee:</p> <ul data-bbox="653 1195 1961 1247" style="list-style-type: none"> <li>• Asked if the UMC contains an exception to the requirements for a duct enclosure for one-story buildings, the committee assured the speaker that there is an exception in both the IMC and UMC.</li> </ul> <p data-bbox="602 1250 951 1276">Discussion from the floor: None</p> <p data-bbox="602 1279 926 1305">Passed by a unanimous vote.</p>	<p data-bbox="1329 224 1761 250">to Sections 510.7.3.1 through 510.7.3.3.</p> <p data-bbox="1329 253 2028 412"><b>510.7.3.1</b> Field-applied grease duct enclosures and factory-built grease duct enclosures shall demonstrate that they provide sufficient mechanical and structural integrity, resiliency, and stability when subjected to expected building environmental conditions, duct movement under general operating conditions, and duct movement due to interior and exterior fire conditions.</p> <p data-bbox="1329 415 2028 548"><b>510.7.3.2</b> Measures shall be taken to prevent physical damage to any covering or enclosure material. Any damage to the covering or enclosure shall be repaired and the covering or enclosure restored to meet its intended listing and fire-resistive rating and to be acceptable to the Authority Having Jurisdiction.</p> <p data-bbox="1329 552 2028 743"><b>510.7.3.3</b> In the event of a fire within a kitchen exhaust system, the duct, the enclosure, or the covering directly applied to the duct shall be inspected by qualified personnel to determine whether the duct, the enclosure, and the covering directly applied to the duct are structurally sound, capable of maintaining their fire protection functions, suitable for continued operation, and acceptable to the Authority Having Jurisdiction.</p> <p data-bbox="1329 747 1877 773"><b>510.7.4</b> For listed grease ducts, see Section 510.4.</p> <p data-bbox="1329 776 2028 987"><b>510.7.5</b> If openings in the enclosure walls are provided, they shall be protected by approved self-closing fire doors of proper rating. Fire doors shall be installed in accordance with NFPA 80, Standard for Fire Doors and Fire Windows. Openings on other listed materials or products shall be clearly identified and labeled according to the terms of the listing and the manufacturer's instructions and shall be acceptable to the Authority Having Jurisdiction. The panels shall be readily accessible.</p> <p data-bbox="1329 990 2028 1097"><b>510.7.6</b> Each duct system shall constitute an individual system serving only exhaust hoods in one fire zone on one floor. Multiple ducts shall not be permitted in a single enclosure unless acceptable to the Authority Having Jurisdiction.</p>
<p data-bbox="184 1307 281 1333"><b>ITEM 22</b></p> <p data-bbox="184 1336 575 1362"><b>716.2.2 Hazardous exhaust ducts.</b></p> <p data-bbox="184 1365 575 1412">Fire dampers for hazardous exhaust duct systems shall comply with the</p>	<p data-bbox="602 1307 1293 1362"><b>607.2.2 Hazardous exhaust ducts.</b> Fire dampers for hazardous exhaust duct systems shall comply with Section 510.</p> <p data-bbox="602 1365 1268 1412">[Commission staff finds no discussion of fire dampers in §510, only balance dampers.]</p>	<p data-bbox="1329 1336 1692 1362">No requirement in the 2003 UMC.</p>

IBC Code Section	IMC Code Section	UMC Code Section
<p><i>International Mechanical Code.</i></p>	<p><b>Committee Comments &amp; Action</b></p> <p><input checked="" type="checkbox"/> The uniform code does not address requirements in the international code. What is missing from the uniform code:</p> <p>Discussion by the Committee:</p> <ul style="list-style-type: none"> <li>• UMC §606.1 has provisions for fire dampers when required by the Building Code. The IBC refers back to the IMC, not adopted by California.</li> <li>• After much discussion, committee agreed that missing from the UMC is the IMC requirement for rated shaft construction in lieu of fire dampers for hazardous exhaust ducts.</li> </ul> <p>Discussion from the floor:</p> <ul style="list-style-type: none"> <li>• IMC should contain a protocol directing the user to the alternate methodology.</li> <li>• IAPMO needs this information to correlate their code with the IBC. This was done in the 2000 code development process.</li> <li>• CBSC expects to work with IAPMO further in the code development process.</li> </ul> <p>Passed by a unanimous vote.</p>	
<p><b>ITEM 23</b></p> <p><b>716.5.4 Fire partitions.</b> Duct penetrations in fire partitions shall be protected with approved fire dampers installed in accordance with their listing.</p> <p><b>Exceptions:</b> In occupancies other than Group H, fire dampers are not required where any of the following apply:</p> <ol style="list-style-type: none"> <li>1. The partitions are tenant separation and corridor walls in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and the duct is protected as a through penetration in accordance with Section 712.</li> <li>2. The duct system is constructed of approved materials in accordance with the <i>International Mechanical Code</i> and the duct penetrating the wall meets all of the following minimum requirements:</li> </ol> <p>...</p> <ol style="list-style-type: none"> <li>2.2. The duct shall be constructed of steel a minimum of 0.0217 inch (0.55 mm) in thickness.</li> </ol>	<p><b>603.4 Metallic ducts.</b> All metallic ducts shall be constructed as specified in the SMACNA <i>HVAC Duct Construction Standards—Metal and Flexible</i>.</p> <p><b>Exception:</b> Ducts installed within single dwelling units shall have a minimum thickness as specified in Table 603.4.</p>	<p><b>602.1 General.</b> Supply air, return air, and outside air for heating, cooling, or evaporative cooling systems shall be conducted through duct systems constructed of metal as set forth in Tables 6-1, 6-2, 6-3, 6-4, 6-7, 6-8, <b>6-9</b>, and 6-10, or metal ducts complying with UMC Standard No. 6-2 or the referenced HVAC duct construction standard in Chapter 17, Part II. Rectangular ducts in excess of 2 inches w.g. shall comply with UMC Standard No. 6-2 or the referenced HVAC duct construction standard in Chapter 17, Part II. Ducts, plenums, and fittings may be constructed of asbestos cement, concrete, clay, or ceramics when installed in the ground or in a concrete slab, provided the joints are tightly sealed.</p>

IBC Code Section	IMC Code Section	UMC Code Section
	<ul style="list-style-type: none"> <li>When the committee reconvened after lunch, IAPMO's representative announced off-topic that the preprint of the 2006 UMC ventilation standards, including committee action to accept, is available on IAPMO's web site.</li> </ul> <p><b>Committee Comments &amp; Action</b></p> <p><input checked="" type="checkbox"/> The requirements are equivalent.</p> <p>Discussion by the Committee: None</p> <p>Discussion from the floor: None</p> <p>Passed by a unanimous vote.</p>	
<p><b>ITEM 24</b></p> <p><b>716.6.1 Through penetrations.</b> In occupancies other than Groups I-2 and I-3, a duct and air transfer opening system constructed of approved materials in accordance with the <i>International Mechanical Code</i> that penetrates a fire-resistance-rated floor/ceiling assembly that connects not more than two stories is permitted without shaft enclosure protection provided a fire damper is installed at the floor line.</p> <p><b>716.6.2 Membrane penetrations.</b> Where duct systems constructed of approved materials in accordance with the <i>International Mechanical Code</i> penetrate a ceiling of a fire-resistance-rated floor/ceiling or roof/ceiling assembly, shaft enclosure protection is not required provided an approved ceiling radiation damper is installed at the ceiling line.</p> <p><b>716.6.3 Non fire-resistance-rated assemblies.</b> Duct systems constructed of approved materials in accordance with the <i>International Mechanical Code</i> that penetrate non fire-resistance-rated floor assemblies and that connect not more than two stories are permitted without shaft enclosure protection provided that the annular space between the assembly and the penetrating duct is</p>	<p><b>603.4 Metallic ducts.</b> All metallic ducts shall be constructed as specified in the <i>SMACNA HVAC Duct Construction Standards—Metal and Flexible</i>.</p> <p><b>Exception:</b> Ducts installed within single dwelling units shall have a minimum thickness as specified in Table 603.4.</p> <p><b>603.5 Nonmetallic ducts.</b> Nonmetallic ducts shall be constructed with Class 0 or Class 1 duct material in accordance with UL 181. Fibrous duct construction shall conform to the <i>SMACNA Fibrous Glass Duct Construction Standards</i> or <i>NAIMA Fibrous Glass Duct Construction Standards</i>. The maximum air temperature within nonmetallic ducts shall not exceed 250°F (121°C).</p> <p><b>603.5.1 Gypsum ducts.</b> The use of gypsum boards to form air shafts (ducts) shall be limited to return air systems where the air temperatures do not exceed 125°F (52°C) and the gypsum board surface temperature is maintained above the airstream dew-point temperature. Air ducts formed by gypsum boards shall not be incorporated in air-handling systems utilizing evaporative coolers.</p> <p><b>603.6 Flexible air ducts and flexible air connectors.</b> Flexible air ducts, both metallic and nonmetallic, shall comply with Sections 603.6.1, 603.6.1.1, 603.6.3 and 603.6.4. Flexible air connectors, both metallic and nonmetallic, shall comply with Sections 606.6.2 through 603.6.4.</p> <p><b>603.6.1 Flexible air ducts.</b> Flexible air ducts, both metallic and nonmetallic, shall be tested in accordance with UL 181. Such ducts shall be listed and labeled as Class 0 or Class 1 flexible air ducts and shall be installed in accordance with Section 304.1.</p> <p><b>603.6.1.1 Duct length.</b> Flexible air ducts shall not be limited in length.</p> <p><b>603.6.2 Flexible air connectors.</b> Flexible air connectors, both metallic and nonmetallic, shall be tested in accordance with UL 181. Such connectors shall be listed and labeled as Class 0 or Class 1 flexible air connectors and shall be installed in accordance with Section 304.1.</p> <p><b>603.6.2.1 Connector length.</b> Flexible air connectors shall be limited in length to 14 feet (4267 mm).</p> <p><b>603.6.2.2 Connector penetration limitations.</b> Flexible air</p>	<p><b>602.1 General.</b> Supply air, return air, and outside air for heating, cooling, or evaporative cooling systems shall be conducted through duct systems constructed of metal as set forth in Tables 6-1, 6-2, 6-3, 6-4, 6-7, 6-8, 6-9, and 6-10, or metal ducts complying with UMC Standard No. 6-2 or the referenced HVAC duct construction standard in Chapter 17, Part II. Rectangular ducts in excess of 2 inches w.g. shall comply with UMC Standard No. 6-2 or the referenced HVAC duct construction standard in Chapter 17, Part II. Ducts, plenums, and fittings may be constructed of asbestos cement, concrete, clay, or ceramics when installed in the ground or in a concrete slab, provided the joints are tightly sealed.</p> <p><b>602.3 Factory-Made Air Ducts.</b> Factory-made air ducts shall be approved for the use intended or shall conform to the requirements of the referenced standard for air ducts in Chapter 17, Part II. Each portion of a factory-made air duct system shall be identified by the manufacturer with a label or other suitable identification indicating compliance with the referenced standard for air ducts in Chapter 17, Part II, and its class designation. These ducts shall be listed and shall be installed in accordance with the terms of their listing and the requirements of UMC Standard No. 6-5. Flexible air connectors are not permitted.</p> <p><b>602.4 Joints and Seams of Ducts.</b> Joints of duct systems shall be made substantially airtight by means of tapes, mastics, gasketing, or other means. Crimp joints for round ducts shall have a contact lap of at least 1-1/2 inch (38 mm) and shall be mechanically fastened by means of at least three sheet-metal screws equally spaced around the joint, or an equivalent fastening method. Joints and seams for 0.016 inch (0.41 mm) (No. 28 gauge) and 0.013 inch (0.33 mm) (No. 30 gage) residential rectangular ducts shall be as specified in Table 6-1 for 0.019 inch (0.48 mm) (No. 26 gage) material. Joints and seams for rectangular duct systems shall be as specified in Table 6-1. Joints and seams for flat oval ducts and round ducts in other than</p>

IBC Code Section	IMC Code Section	UMC Code Section
filled with an approved noncombustible material to resist the free passage of flame and the products of combustion. Duct systems constructed of approved materials in accordance with the <i>International Mechanical Code</i> that penetrate non fire-resistance-rated floor assemblies and that connect not more than three stories are permitted without shaft enclosure protection provided that the annular space between the assembly and the penetrating duct is filled with an approved noncombustible material to resist the free passage of flame and the products of combustion, and a fire damper is installed at each floor line. <b>Exception:</b> Fire dampers are not required in ducts within individual residential dwelling units.	connectors shall not pass through any wall, floor or ceiling. <b>603.6.3 Air temperature.</b> The design temperature of air to be conveyed in flexible air ducts and flexible air connectors shall be less than 250°F (121°C). <b>603.6.4 Flexible air duct and air connector clearance.</b> Flexible air ducts and air connectors shall be installed with a minimum clearance to an appliance as specified in the appliance manufacturer's installation instructions.	single-dwelling units shall be as specified in Table 6-8. Joints and seams and all reinforcements for factory-made air ducts and plenums shall meet with the conditions of prior approval in accordance with the installation instructions that shall accompany the product. Closure systems for rigid air ducts and plenums shall be listed in accordance with UL 181A, Standard for Closure Systems for Use with Rigid Air Ducts and Air Connectors. Flexible air ducts shall be listed in accordance with UL 181B, Standard for Closure Systems for Use with Flexible Air Ducts and Air Connectors.
<b>ITEM 25</b> <b>717.5 Combustibles in concealed spaces in Type I or II construction.</b> Combustibles shall not be permitted in concealed spaces of buildings of Type I or II construction. <b>Exceptions:</b> 1. Combustible materials in accordance with Section 603. 2. Combustible materials complying with Section 602 of the <i>International Mechanical Code</i> . 3. Class A interior finish materials. 4. Combustible piping within partitions or enclosed shafts installed in accordance with the provisions of this code. Combustible piping shall be permitted within concealed ceiling spaces where installed in accordance with the <i>International Mechanical Code</i> and the	<b>Committee Comments &amp; Action</b> <input checked="" type="checkbox"/> The requirements are equivalent. Discussion by the Committee: None Discussion from the floor: None Passed by a unanimous vote.	
	See Item 18 above	See Item 18 above
<b>Committee Comments &amp; Action</b> <input checked="" type="checkbox"/> The requirements are equivalent. Discussion by the Committee: None Discussion from the floor: None Passed by a unanimous vote.		

IBC Code Section	IMC Code Section	UMC Code Section
<i>International Plumbing Code.</i>		
<p><b>ITEM 26</b>  <b>719.1 General.</b> Insulating materials, including facings such as vapor retarders and vapor-permeable membranes, similar coverings, and all layers of single and multilayer reflective foil insulations, shall comply with the requirements of this section. Where a flame spread index or a smoke-developed index is specified in this section, such index shall be determined in accordance with ASTM E 84. Any material that is subject to an increase in flame spread index or smoke-developed index beyond the limits herein established through the effects of age, moisture, or other atmospheric conditions shall not be permitted.  <b>Exceptions:</b>  1. Fiberboard insulation shall comply with Chapter 23.  2. Foam plastic insulation shall comply with Chapter 26.  3. Duct and pipe insulation and duct and pipe coverings and linings in plenums shall comply with the <i>International Mechanical Code</i>.</p>	<p>See Item 18 above.</p> <p><b>Committee Comments &amp; Action</b>  <input checked="" type="checkbox"/> The requirements are equivalent.  Discussion by the Committee: None  Discussion from the floor: None  Passed by a unanimous vote.</p>	<p>See Item 18 above.</p>
<p><b>ITEM 27</b>  <b>[F] 903.2.12.1 Ducts conveying hazardous exhausts.</b> Where required by the <i>International Mechanical Code</i>, automatic sprinklers shall be provided in ducts conveying hazardous exhaust, or flammable or combustible materials.  <b>Exception:</b> Ducts in which the largest cross-sectional diameter of the duct is less than 10 inches (254 mm).</p>	<p><b>510.7 Suppression required.</b> Ducts shall be protected with an approved automatic fire suppression system installed in accordance with the <i>International Building Code</i>.  <b>Exceptions:</b>  1. An approved automatic fire suppression system shall not be required in ducts conveying materials, fumes, mists and vapors that are nonflammable and noncombustible under all conditions and at any concentrations.  2. An approved automatic fire suppression system shall not be required in ducts where the largest cross-sectional diameter of the duct is less than 10 inches (254 mm).</p>	<p><b>506.6 Fire Protection.</b> Sprinklers or other fire-protection devices shall be installed within ducts having a cross-sectional dimension exceeding ten (10) inches (254 mm) when the duct conveys flammable vapors or fumes. Sprinklers shall be installed at twelve (12) foot (3658 mm) intervals in horizontal ducts and at changes in direction. In vertical runs, sprinklers shall be installed at the top and at alternate floor levels.</p>

IBC Code Section	IMC Code Section	UMC Code Section
	<b>Committee Comments &amp; Action</b> <input checked="" type="checkbox"/> The requirements are equivalent. Discussion by the Committee: None Discussion from the floor: None Passed by a unanimous vote.	
<b>ITEM 28</b> <b>[F] 904.2.1 Hood system suppression.</b> Each required commercial kitchen exhaust hood and duct system required by the <i>International Fire Code</i> or the <i>International Mechanical Code</i> to have a Type I hood shall be protected with an approved automatic fire-extinguishing system installed in accordance with this code.	<b>507.2 Where required.</b> A Type I or Type II hood shall be installed at or above all commercial cooking appliances in accordance with Sections 507.2.1 and 507.2.2. Where any cooking appliance under a single hood requires a Type I hood, a Type I hood shall be installed. Where a Type II hood is required, a Type I or Type II hood shall be installed. <b>507.2.1 Type I hoods.</b> Type I hoods shall be installed where cooking appliances produce grease or smoke, such as occurs with griddles, fryers, broilers, ovens, ranges and wok ranges.  <b>SECTION 509</b> <b>FIRE SUPPRESSION SYSTEMS</b> <b>509.1 Where required.</b> Commercial cooking appliances required by Section 507.2.1 to have a Type I hood shall be provided with an approved automatic fire suppression system complying with the <i>International Building Code</i> and the <i>International Fire Code</i> . [§904 in both IBC and IFC describe the system.]	
	<b>Committee Comments &amp; Action</b> <input checked="" type="checkbox"/> The requirements are equivalent. Discussion by the Committee: <ul style="list-style-type: none"> <li>IBC and IMC only address requirements for a Type I hood.</li> </ul> Discussion from the floor: None Passed by a unanimous vote.	
<b>ITEM 29</b> <b>[F] 904.11 Commercial cooking systems.</b> The automatic fire-extinguishing system for commercial cooking systems shall be of a type recognized for protection of commercial cooking equipment and exhaust systems of the type and arrangement protected. Pre engineered automatic dry- and wet-chemical extinguishing systems shall be tested in accordance with UL 300 and listed and labeled for the intended application. Other types of automatic fire-extinguishing systems		<b>502.0 Definitions.</b> <b>HOOD.</b> An air-intake device connected to a mechanical exhaust system for collecting and removing grease, vapors, fumes, smoke, steam, heat, or odors from commercial food heat-processing equipment. <b>Fixed Baffle.</b> A listed unitary exhaust hood design where the grease removal device is a nonremovable assembly that contains an integral fire-activated water-wash fire-extinguishing system listed for this purpose. <b>Type I</b> is a kitchen hood for collecting and removing grease and smoke. <b>Type II</b> is a general kitchen hood for collecting and removing steam, vapor, heat, or odors.  [UMC §513 describes the fire-extinguishing equipment.]

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<p>shall be listed and labeled for specific use as protection for commercial cooking operations. The system shall be installed in accordance with this code, its listing and the manufacturer's installation instructions. Automatic fire-extinguishing systems of the following types shall be installed in accordance with the referenced standard indicated, as shown:</p> <ol style="list-style-type: none"> <li>1. Carbon dioxide extinguishing systems, NFPA 12.</li> <li>2. Automatic sprinkler systems, NFPA 13.</li> <li>3. Foam-water sprinkler system or foam-water spray systems, NFPA 16.</li> <li>4. Dry-chemical extinguishing systems, NFPA 17.</li> <li>5. Wet-chemical extinguishing systems, NFPA 17A.</li> </ol> <p><b>Exception:</b> Factory-built commercial cooking recirculating systems that are tested in accordance with UL 197, and listed, labeled and installed in accordance with Section 304.1 of the <i>International Mechanical Code</i>.</p>	<p><b>304.1 General.</b> Equipment and appliances shall be installed as required by the terms of their approval, in accordance with the conditions of the listing, the manufacturer's installation instructions and this code. Manufacturer's installation instructions shall be available on the job site at the time of inspection.</p> <p><b>Committee Comments &amp; Action</b></p> <p><input checked="" type="checkbox"/> The requirements are equivalent.  Discussion by the Committee: None  Discussion from the floor: None  Passed by a unanimous vote.</p>	<p><b>304.1 Listed Appliances.</b> Except as otherwise provided in the code, the installation of appliances regulated by this code shall conform to the conditions of listing. The appliance installer shall leave the manufacturer's installation and operating instructions attached to the appliance. Clearances of listed appliances from combustible materials shall be as specified in the listing or on the rating plate.</p> <p><b>508.6 Listed Hood Assemblies.</b> Listed hood assemblies shall be installed in accordance with the terms of their listing and the manufacturer's instructions.  [§516 describes recirculating systems.]</p>
<p><b>ITEM 30</b>  <b>[F] 908.6 Refrigerant detector.</b> Machinery rooms shall contain a refrigerant detector with an audible and visual alarm. The detector, or a sampling tube that draws air to the detector, shall be located in an area where refrigerant from a leak will concentrate. The alarm shall be actuated at a value not greater than the corresponding TLV-TWA values for the refrigerant classification indicated in the <i>International Mechanical Code</i>. Detectors and alarms shall be placed in approved locations.</p>	<p><b>[F] 1105.3 Refrigerant detector.</b> Refrigerant detectors in machinery rooms shall be provided as required by the <i>International Fire Code</i>.  [Refrigeration classifications are listed on IMC Table 1103.1.]</p>	<p><b>1107.4 Refrigerant-Vapor Alarms.</b> Machinery rooms shall have approved refrigerant-vapor detectors located in an area where refrigerant from a leak is likely to concentrate and that will activate visual and audible alarms. Alarms shall be activated at a value not greater than one-half the immediately dangerous to life or health (IDLH), or measurement consistent therewith; the PEL, or measurement consistent therewith; or 25 percent of the LFL, whichever is less.</p> <p><b>1121.1 General.</b> When required by this chapter, approved refrigerant-vapor detection and alarm systems shall utilize alarm signaling devices providing a sound pressure level of at least 15 Db above the operating ambient noise sound pressure level of the space in that they are installed and providing an approved, distinctive visual alarm. Alarms shall be activated within the space and as required in Section 1121.3 whenever the refrigerant vapor PEL is exceeded. In other than machinery rooms, such systems</p>

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<p><b>Exception:</b> Detectors are not required in ammonia system machinery rooms equipped with a vapor detector in accordance with the <u>International Mechanical Code</u>.</p>	<p><b>1106.3 Ammonia room ventilation.</b> Ventilation systems in ammonia machinery rooms shall be operated continuously.</p> <p><b>Exceptions:</b></p> <ol style="list-style-type: none"> <li>1. Machinery rooms equipped with a vapor detector that will automatically start the ventilation system and actuate an alarm at a detection level not to exceed 1,000 ppm; or</li> <li>2. Machinery rooms conforming to the Class 1, Division 2, hazardous location classification requirements of NFPA 70.</li> </ol> <p><b>Committee Comments &amp; Action</b></p> <p><input checked="" type="checkbox"/> The requirements are equivalent.</p> <p>Discussion by the Committee:</p> <ul style="list-style-type: none"> <li>• The note at the end of the UMC column should refer to vapor detectors only for ammonia.</li> <li>• UMC §1121.1 includes ammonia detected at a minimum 50% of the IDLH, while IMC §1106.3, Exception 1 cites a minimum of 1000 ppm for specifically for ammonia.</li> </ul> <p>Discussion from the floor:</p> <ul style="list-style-type: none"> <li>• The content of this comparison chart was reviewed by ICC but not by IAPMO prior to this meeting.</li> </ul> <p>Passed by a unanimous vote.</p>	<p>shall also automatically stop the flow of refrigerant to evaporators within the space and stop the flow of refrigerant in all supply lines leaving the machinery room whenever the refrigerant vapor concentration is detected at or above 50 percent of the IDLH or 25 percent of the LEL. Detection of refrigerant vapor concentrations at or above 25 percent of the LEL shall automatically de-energize all electrical power within the space that does not meet the requirement for a Class I, Division 1, Group D electrical installation.</p> <p><b>1121.2 Power and Supervision.</b> Detection and alarm systems shall be powered and supervised as required for fire alarm systems in the Fire Code.</p> <p><b>1121.3 Annunciation.</b> Detection and alarm systems shall be annunciated for all refrigerants at an approved location in accordance with the Fire Code.</p> <p><b>1121.4 Installation, Maintenance, and Testing.</b> Detection and alarm systems shall be installed, maintained, and tested in accordance with the Fire Code.</p> <p>[Refrigeration classifications are listed on UMC Table 11-1.]</p> <p>No ammonia requirements are in the 2003 UMC.</p>
<p><b>ITEM 31</b></p> <p><b>SECTION 909</b></p> <p><b>SMOKE CONTROL SYSTEMS</b></p> <p><b>909.1 Scope and purpose.</b> This section applies to mechanical or passive smoke control systems when they are required by other provisions of this code. The purpose of this section is to establish minimum requirements for the design, installation and acceptance testing of smoke control systems that are intended to provide a tenable environment for the</p>	<p><b>CHAPTER 5</b></p> <p><b>EXHAUST SYSTEMS</b>, except for §513, which describes smoke control systems that are intended to provide a tenable environment for the evacuation or relocation of occupants.</p>	<p><b>504.1 Makeup and Exhaust-Air Ducts.</b> Environmental air ducts not regulated by other provisions of this code shall comply with this section. Ducts shall be substantially airtight and shall comply with the provisions of Chapter 6. Exhaust ducts shall not extend into or through ducts or plenums. Exhaust ducts shall terminate outside the building and shall be equipped with back-draft dampers. Environmental air ducts which have an alternate function as a part of an approved smoke-control system do not require design as Class 1 product-conveying ducts.</p> <p>No other requirements in the 2003 UMC.</p>

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<p>evacuation or relocation of occupants. These provisions are not intended for the preservation of contents, the timely restoration of operations or for assistance in fire suppression or overhaul activities. Smoke control systems regulated by this section serve a different purpose than the smoke- and heat-venting provisions found in Section 910. Mechanical smoke control systems shall not be considered exhaust systems under Chapter 5 of the <i>International Mechanical Code</i>.</p>	<p><b>Committee Comments &amp; Action</b></p> <p><input checked="" type="checkbox"/> The requirements are equivalent.</p> <p>Discussion by the Committee:</p> <ul style="list-style-type: none"> <li>• Its subsections all designated by [B], IMC §513 is a duplication of sections in the IBC. The last sentence of UMC §504.1 says the same thing as the IMC in a different way. The balance of Chapter 5 in each code addresses exhaust systems, not to be confused with smoke control systems.</li> <li>• UMC §609.0 also contains provisions for smoke control systems.</li> <li>• The committee recommended changing the reference from the IMC to the CMC.</li> </ul> <p>Discussion from the floor:</p> <ul style="list-style-type: none"> <li>• CBSC asked if IBC §909.1 could stand alone without the reference to the IMC.</li> </ul> <p>Discussion by the Committee:</p> <ul style="list-style-type: none"> <li>• The committee answered CBSC in the affirmative.</li> </ul> <p>Passed by a unanimous vote.</p>	
<p><b>ITEM 32</b></p> <p><b>909.10.2 Ducts.</b> Duct materials and joints shall be capable of withstanding the probable temperatures and pressures to which they are exposed as determined in accordance with Section 909.10.1. Ducts shall be constructed and supported in accordance with the <i>International Mechanical Code</i>. Ducts shall be leak tested to 1.5 times the maximum design pressure in accordance with nationally accepted practices. Measured leakage shall not exceed 5 percent of design flow. Results of such testing shall be a part of the documentation procedure. Ducts shall be supported directly from fire-resistance-rated structural elements of the building by substantial, noncombustible supports.</p> <p><b>Exception:</b> Flexible connections (for the purpose of vibration isolation) complying with the <i>International Mechanical Code</i>, that are constructed of approved fire-resistance-rated materials.</p>	<p><b>603.4 Metallic ducts.</b> All metallic ducts shall be constructed as specified in the SMACNA <i>HVAC Duct Construction Standards—Metal and Flexible</i>.</p> <p><b>Exception:</b> Ducts installed within single dwelling units shall have a minimum thickness as specified in Table 603.4.</p> <p><b>603.5 Nonmetallic ducts.</b> Nonmetallic ducts shall be constructed with Class 0 or Class 1 duct material in accordance with UL 181. Fibrous duct construction shall conform to the SMACNA <i>Fibrous Glass Duct Construction Standards</i> or NAIMA <i>Fibrous Glass Duct Construction Standards</i>. The maximum air temperature within nonmetallic ducts shall not exceed 250°F (121°C).</p> <p><b>603.5.1 Gypsum ducts.</b> The use of gypsum boards to form air shafts (ducts) shall be limited to return air systems where the air temperatures do not exceed 125°F (52°C) and the gypsum board surface temperature is maintained above the airstream dew-point temperature. Air ducts formed by gypsum boards shall not be incorporated in air-handling systems utilizing evaporative coolers.</p> <p><b>603.9 Joints, seams and connections.</b> All longitudinal and transverse joints, seams and connections in metallic and nonmetallic ducts shall be constructed as specified in SMACNA <i>HVAC Duct Construction Standards—Metal and Flexible</i> and SMACNA <i>Fibrous Glass Duct Construction Standards</i> or NAIMA <i>Fibrous Glass Duct Construction Standards</i>. All longitudinal and transverse joints, seams and connections shall be sealed in accordance with the <i>International Energy Conservation Code</i>.</p> <p><b>603.10 Supports.</b> Ducts shall be supported with approved hangers at intervals not exceeding 10 feet (3048 mm) or by other approved duct support systems designed in accordance with the <i>International Building Code</i>. Flexible and other factory-made ducts shall be supported in accordance with the manufacturer's</p>	<p><b>602.1 General.</b> Supply air, return air, and outside air for heating, cooling, or evaporative cooling systems shall be conducted through duct systems constructed of metal as set forth in Tables 6-1, 6-2, 6-3, 6-4, 6-7, 6-8, 6-9, and 6-10, or metal ducts complying with UMC Standard No. 6-2 or the referenced HVAC duct construction standard in Chapter 17, Part II. Rectangular ducts in excess of 2 inches w.g. shall comply with UMC Standard No. 6-2 or the referenced HVAC duct construction standard in Chapter 17, Part II. Ducts, plenums, and fittings may be constructed of asbestos cement, concrete, clay, or ceramics when installed in the ground or in a concrete slab, provided the joints are tightly sealed.</p> <p>...</p> <p>When gypsum products are exposed in ducts or plenums, the air temperature shall be restricted to a range from 50°F (10°C) to 125°F (52°C), and moisture content shall be controlled so that the material is not adversely affected. For the purpose of this section, gypsum products shall not be exposed in ducts serving as supply from evaporative coolers, and in other air-handling systems regulated by this chapter when the temperature of the gypsum product will be below the dew point temperature.</p> <p><b>602.4 Joints and Seams of Ducts.</b> Joints of duct systems shall be made substantially airtight by means of tapes, mastics, gasketing, or other means. Crimp joints for round ducts shall have a contact lap of at least 1-1/2 inch (38 mm) and shall be mechanically fastened by means of at least three sheet-metal screws equally spaced around the joint, or an equivalent fastening method. Joints and seams for 0.016 inch (0.41 mm) (No. 28 gauge) and 0.013 inch (0.33 mm) (No. 30 gauge) residential rectangular ducts</p>

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	<p>installation instructions.</p> <p><b>301.10 Vibration isolation.</b> Where vibration isolation of equipment and appliances is employed, an approved means of supplemental restraint shall be used to accomplish the support and restraint.</p>	<p>shall be as specified in Table 6-1 for 0.019 inch (0.48 mm) (No. 26 gage) material.</p> <p>Joints and seams for rectangular duct systems shall be as specified in Table 6-1.</p> <p>Joints and seams for flat oval ducts and round ducts in other than single-dwelling units shall be as specified in Table 6-8.</p> <p><b>604.1 Metal Ducts.</b> Ducts shall be securely fastened in place at each change of direction and as set forth in Table 6-7. Vertical rectangular ducts and vertical round ducts shall be supported as set forth in Table 6-7, Part A. Riser ducts shall be held in place by means of metal straps or angles and channels to secure the riser to the structure.</p> <p>Supports for rectangular ducts as set forth in Table 6-7, when suspended from above, shall be installed on two opposite sides of each duct and shall be riveted, bolted, or metal screwed to each side of the duct at not more than the intervals specified.</p> <p>Horizontal round ducts forty (40) inches (1016 mm) or less in diameter when suspended from above shall be supported at intervals not more than as set forth in Table 6-7 with one hanger installed to comply with the requirements listed below:</p> <p><b>604.1.1</b> Ducts shall be equipped with tight-fitting circular bands extending around the entire perimeter of the duct at each specified support interval.</p> <p><b>604.1.2</b> Circular bands shall be not less than one (1) inch (25.4 mm) wide nor less than equivalent to the gage of the duct material it supports.</p> <p><b>Exception:</b> Ducts ten (10) inches (254 mm) and less in diameter may be supported by No. 18 gage galvanized steel wire.</p> <p><b>604.1.3</b> Each circular band shall be provided with a suitable means of connecting to the suspending support.</p> <p><b>604.1.4</b> Ducts shall be braced and guyed to prevent lateral or horizontal swing.</p> <p><b>602.7 Vibration Isolators.</b> Vibration isolators installed between mechanical equipment and metal ducts (or casings) shall be made of an approved material and shall not exceed ten (10) inches (254 mm) in length.</p>
	<p><b>Committee Comments &amp; Action</b></p> <p><input checked="" type="checkbox"/> The requirements are equivalent.</p> <p>Discussion by the Committee: None</p> <p>Discussion from the floor: None</p> <p>Passed by a unanimous vote.</p>	

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<p><b>ITEM 33</b>  <b>[Note:</b> §1014.4 addresses refrigeration machinery rooms.]  <b>1014. 5 Refrigerated rooms or spaces.</b> Rooms or spaces having a floor area of 1,000 square feet (93m<sup>2</sup>) or more, containing a refrigerant evaporator and maintained at a temperature below 68°F (20°C), shall have access to not less than two exits or exit access doors.  Travel distance shall be determined as specified in Section 1015.1, but all portions of a refrigerated room or space shall be within 150 feet (45 720 mm) of an exit or exit access door where such rooms are not protected by an approved automatic sprinkler system. Egress is allowed through adjoining refrigerated rooms or spaces.  <b>Exception:</b> Where using refrigerants in quantities limited to the amounts based on the volume set forth in the <i>International Mechanical Code</i>.</p>	<p><b>1104.4 Volume calculations.</b> Volume calculations shall be in accordance with Sections 1104.4.1 through 1104.4.3.  <b>1104.4.1 Noncommunicating spaces.</b> Where the refrigerant-containing parts of a system are located in one or more spaces that do not communicate through permanent openings or HVAC ducts, the volume of the smallest, enclosed occupied space shall be used to determine the permissible quantity of refrigerant in the system.  <b>1104.4.2 Communicating spaces.</b> Where an evaporator or condenser is located in an air duct system, the volume of the smallest, enclosed occupied space served by the duct system shall be used to determine the maximum allowable quantity of refrigerant in the system.  <b>Exception:</b> If airflow to any enclosed space cannot be reduced below one-quarter of its maximum, the entire space served by the air duct system shall be used to determine the maximum allowable quantity of refrigerant in the system.  <b>1104.4.3 Plenums.</b> Where the space above a suspended ceiling is continuous and part of the supply or return air plenum system, this space shall be included in calculating the volume of the enclosed space.</p> <p><b>Committee Comments &amp; Action</b>  <input checked="" type="checkbox"/> The requirements are equivalent.  Discussion by the Committee: None  Discussion from the floor: None  Passed by a unanimous vote.</p>	<p><b>1105.2 Volume of Occupied Space.</b> The quantity of refrigerant in a single, independent circuit of a high-probability system shall not exceed the amounts shown in Table 11-1 based on the volume of the normally occupied space. The volume of the smallest, enclosed, normally occupied space shall be used to determine the permissible quantity of refrigerant in a system which is located in, serves, or passes through such space.  <b>Exceptions:</b>  (1) If the airflow to any enclosed space served by a portion of an air-duct system cannot be shut off or reduced below one quarter of its maximum, the cubical contents of the entire space served by that portion of the air-duct system shall be used to determine the permissible quantity of refrigerant in the system.  (2) Refrigerated process or storage areas meeting the requirements of Section 1105.3.  <b>1105.3 Refrigerated Process and Storage Areas.</b>  Refrigerant quantities in evaporators and piping within rooms or spaces used exclusively for processing or storage of materials under refrigerated conditions shall not be limited, provided that exiting is provided per the Building Code and that:  <b>1105.3.1</b> The refrigerated room or space is equipped with a refrigerant vapor detection and alarm system complying with Section 1121.0.  <b>1105.3.2</b> The refrigerated room or space is sealed from all other portions of the building by vapor-tight construction and tight-fitting, gasketed doors.  <b>Exception:</b> Adjoining refrigerated rooms.</p>
<p><b>ITEM 34</b>  <b>1016.4.1 Corridor ceiling.</b> Use of the space between the corridor ceiling and the floor or roof structure above as a return air plenum is permitted for one or more of the following conditions:  1. The corridor is not required to be of fire-resistance-rated construction;  2. The corridor is separated from the plenum by fire-resistance-rated</p>	<p><b>606.4 Controls operation.</b> Upon activation, the smoke detectors shall shut down the air distribution system. Air distribution systems that are part of a smoke control system shall switch to the smoke control mode upon activation of a detector.  <b>606.4.1 Supervision.</b> The duct smoke detectors shall be connected to a fire alarm system. The actuation of a duct smoke detector shall activate a visible and audible supervisory signal at a constantly attended location.  <b>Exceptions:</b>  1. The supervisory signal at a constantly attended location is not required where the duct smoke detector activates the building's</p>	<p><b>602.0 Material.</b>  <b>602.1 General.</b>  ...  Corridors shall not be used to convey air to or from rooms if the corridor is required to be of fire-resistive construction per the Building Code.  [Note: This wording does not appear compatible with the IBC.]  Concealed building spaces or independent construction within buildings may be used as ducts or plenums.  <b>609.0 Automatic Shutoffs.</b> Air-moving systems supplying air in excess of 2000 cubic feet per minute (944 L/s) to enclosed</p>

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<p>construction; 3. The air-handling system serving the corridor is shut down upon activation of the air-handling unit smoke detectors required by the <i>International Mechanical Code</i>.</p>	<p>alarm-indicating appliances. 2. In occupancies not required to be equipped with a fire alarm system, actuation of a smoke detector shall activate a visible and an audible signal in an approved location. Duct smoke detector trouble conditions shall activate a visible or audible signal in an approved location and shall be identified as air duct detector trouble.</p>	<p>spaces within buildings shall be equipped with an automatic shutoff. Automatic shutoff shall be accomplished by interrupting the power source of the air-moving equipment upon detection of smoke in the main supply-air duct served by such equipment. Smoke detectors shall be labeled by an approved agency for air duct installation and shall be installed in accordance with the manufacturer's approved instructions. Such devices shall be compatible with the operating velocities, pressures, temperatures and humidities of the system. Where fire-detection or alarm systems are provided for the building, the smoke detectors required by this section shall be supervised by such systems. <b>Exceptions:</b> (1) When the space supplied by the air-moving equipment is served by a total coverage smokedetection system complying with the Fire Code, interconnection to such system may be used to accomplish the required shutoff. (2) Automatic shutoff is not required when all occupied rooms served by the air-handling equipment have direct exit to the exterior and the travel distance does not exceed 100 feet (30,480 mm). (3) Automatic shutoff is not required for Group R, Division 3 and Group U Occupancies. (4) Automatic shutoff is not required for approved smoke-control systems or where analysis demonstrates shutoff would create a greater hazard such as may be encountered in air-moving equipment supplying specialized portions of Group H Occupancies. Such equipment shall be required to have smoke detection with remote indication and manual shutoff capability at an approved location. (5) Smoke detectors that are factory installed in listed air-moving equipment may be used in lieu of smoke detectors installed in the main supply-air duct served by such equipment.</p>
	<p><b>Committee Comments &amp; Action</b>  <input checked="" type="checkbox"/> The requirements are equivalent.  Discussion by the Committee: <ul style="list-style-type: none"> <li>Discussion of whether the IBC or CBC allowed corridors and/or the ceiling space in corridors to be used as plenums was considered irrelevant after the public comment below was made.</li> </ul> Discussion from the floor: <ul style="list-style-type: none"> <li>The IBC reference deals with air-handling shut-down only.</li> <li>If the committee's process today results in the best code for mechanical designers and installers, it can be supported.</li> </ul> Passed by a unanimous vote.</p>	

IBC Code Section	IMC Code Section	UMC Code Section
<p><b>ITEM 35</b>  <b>SECTION 1203 VENTILATION</b>  <b>1203.1 General.</b> Buildings shall be provided with natural ventilation in accordance with Section 1202.4, or mechanical ventilation in accordance with the <i>International Mechanical Code</i>.</p>	<p><b>Refer</b> to IMC §§403 through 406 and Table 403.3, whose length preclude their reproduction on this chart</p> <p><b>Committee Comments &amp; Action</b>  <input checked="" type="checkbox"/> The requirements are equivalent.  Discussion by the Committee:  <ul style="list-style-type: none"> <li>The 2003 UMC makes reference to ASHRAE 62, and the proposed 2006 UMC contains ventilation standards based on ASHRAE 62.</li> <li>The 2003 UMC reference back to the Building Code could be interpreted as a reference to Part 6, the California Energy Code.</li> </ul> Discussion from the floor:  <ul style="list-style-type: none"> <li>The Building Code generally is defined as Part 2, not Part 6. A specific directive to send the user to Part 6 might be needed.</li> </ul> Discussion by the Committee:  <ul style="list-style-type: none"> <li>Part 6 also contains references back to the Building Code, so we have a circle of references.</li> </ul> Passed by a vote of six to one.</p>	<p>No requirement in the 2003 UMC.  <b>401.0 General.</b>  This chapter contains requirements for evaporative cooling systems and makeup-air requirements for direct-gas-fired heaters, industrial air heaters, and miscellaneous heaters. Ventilation (outdoor) air for occupants shall be designed in accordance with ANSI/ASHRAE 62-2001. Ventilation-air supply requirements for specific occupancies are found in the Building Code.</p>
<p><b>ITEM 36</b>  <b>1203.2.1 Openings into attic.</b>  Exterior openings into the attic space of any building intended for human occupancy shall be covered with corrosion-resistant wire cloth screening, hardware cloth, perforated vinyl or similar material that will prevent the entry of birds, squirrels, rodents, snakes and other similar creatures. The openings therein shall be a minimum of 1/8 inch (3.2 mm) and shall not exceed 1/4 inch (6.4 mm). Where combustion air is obtained from an attic area, it shall be in accordance with Chapter 7 of the <i>International Mechanical Code</i>.</p>	<p><b>701.4.2 Attic space.</b> Where combustion air is obtained from an attic area, the attic ventilating openings shall not be subject to ice or snow blockage, and the attic shall have not less than 30 inches (762 mm) vertical clear height at its maximum point. Attic ventilation openings shall be sufficient to provide the required volume of combustion air and the attic ventilation required by the <i>International Building Code</i>. The combustion air openings shall be provided with a sleeve of not less than 0.019-inch (0.5 mm) (No. 26 Gage) galvanized steel or other approved material extending from the appliance enclosure to at least 6 inches (152 mm) above the top of the ceiling joists and insulation.</p> <p><b>Committee Comments &amp; Action</b>  <input checked="" type="checkbox"/> The requirements are equivalent.  Discussion by the Committee:</p>	<p><b>701.4.1 Two Permanent Openings Method.</b> Two permanent openings, one commencing within 12 in. (300 mm) of the top and one commencing within 12 in. (300 mm) of the bottom of the enclosure, shall be provided. The openings shall communicate directly, or by ducts, with the outdoors or spaces that freely communicate with the outdoors, as follows:  (1) Where directly communicating with the outdoors or where communicating to the outdoors through vertical ducts, each opening shall have a minimum free area of 1 in.2/4000 Btu/h (550 mm2/kW) of total input rating of all equipment in the enclosure. (See Figures 7-2 and 7-3.)  (2) Where communicating with the outdoors through horizontal ducts, each opening shall have a minimum free area of 1 in.2/2000 Btu/h (1100 mm2/kW) of total input rating of all equipment in the enclosure. (See Figure 7-4.)  <b>701.10 Combustion Air Ducts.</b> Combustion air ducts shall comply with the following:  ...  (5) Ducts terminating in attics shall not be screened.</p>



IBC Code Section	IMC Code Section	UMC Code Section
	Chapter 5. Discussion from the floor: None Passed by a unanimous vote.	
<b>ITEM 38</b> <b>1203.4.2.1 Bathrooms.</b> Rooms containing bathtubs, showers, spas and similar bathing fixtures shall be mechanically ventilated in accordance with the <i>International Mechanical Code</i> .	<p><b>Refer</b> to IMC §403 and Table 403.3, whose length preclude their reproduction on this chart.            [Note: Table 4-3 refers to both Toilet rooms and bathrooms.]</p> <p><b>Committee Comments &amp; Action</b></p> <p><input checked="" type="checkbox"/> The requirements are equivalent.</p> <p>Discussion by the Committee:</p> <ul style="list-style-type: none"> <li>ASHRAE 62, referenced in Chapter 4 of the 2003 UMC, does include ventilation requirements for bathrooms.</li> </ul> <p>Discussion from the floor:</p> <ul style="list-style-type: none"> <li>CBSC staff noted that IMC Table 403.3 requires mechanical ventilation for both toilet rooms and bathrooms, and asked if there is anything in the IBC which allows natural ventilation for toilet rooms without bathing fixtures.</li> </ul> <p>Discussion by the Committee:</p> <ul style="list-style-type: none"> <li>IMC §[B]402, which addresses natural ventilation, is a duplicate of a section in the IBC.</li> </ul> <p>Passed by a vote of six to one.</p>	<p>No requirement in the 2003 UMC.</p> <p><b>2001 CBC §1203.3 Ventilation.</b></p> <p>...</p> <p>Bathrooms, water closet compartments, laundry rooms and similar rooms shall be provided with natural ventilation by means of openable exterior openings with an area not less than 1/20 of the floor area of such rooms with a minimum of 1½ square feet 90.14 m<sup>2</sup>).</p> <p><b>EXCEPTION:</b> Laundry rooms in Group R, Division 3 Occupancies.</p> <p>In lieu of required exterior openings for natural ventilation in bathrooms containing a bathtub, shower or combination thereof; laundry rooms; and similar rooms, a mechanical ventilation system connected directly to the outside capable of providing five air changes per hour shall be provided. Such systems shall be connected directly to the outside, and the point of discharge shall be at least 3 feet (914 mm) from any opening that allows air entry into occupied portions of the building. Bathrooms that contain only a water closet, lavatory or combination thereof and similar rooms may be ventilated with an approved mechanical recirculating fan or similar device designed to remove odors from the air.</p>
<b>ITEM 39</b> <b>1203.5 Other ventilation and exhaust systems.</b> Ventilation and exhaust systems for occupancies and operations involving flammable or combustible hazards or other contaminant sources as covered in the <i>International Mechanical Code</i> or the <i>International Fire Code</i> shall be	<p><b>401.7 Contaminant sources.</b> Stationary local sources producing air-borne particulates, heat, odors, fumes, spray, vapors, smoke or gases in such quantities as to be irritating or injurious to health shall be provided with an exhaust system in accordance with Chapter 5 or a means of collection and removal of the contaminants. Such exhaust shall discharge directly to an approved location at the exterior of the building.</p> <p>Refer to IMC §[F] 502.9, which is excerpted from the IFC as noted above.</p>	<p>See Item 37 above</p>

IBC Code Section	IMC Code Section	UMC Code Section
provided as required by both codes.	<b>Committee Comments &amp; Action</b> <input checked="" type="checkbox"/> The requirements are equivalent. Discussion by the Committee: None Discussion from the floor: None Passed by a unanimous vote.	
<b>ITEM 40</b> <b>1209.3 Mechanical appliances.</b> Access to mechanical appliances installed in under-floor areas, in attic spaces and on roofs or elevated structures shall be in accordance with the <i>International Mechanical Code</i> .	<b>Refer</b> to IMC §306, whose length precludes its reproduction on this chart. [This section provides for access to central furnaces, appliances in rooms, appliances in attics, appliances under floors, and equipment and appliances on roofs or elevated structures.]	<b>305.0 Access.</b> Appliances shall be accessible for inspection, service, repair, and replacement without removing permanent construction. Unless otherwise specified, not less than thirty (30) inches (762 mm) in depth, width, and height of working space and platform shall be provided to service the appliance. <b>Exception:</b> Unit heaters and room heaters may be installed with an eighteen (18) inch (457 mm) minimum depth working space. A platform shall not be required for unit heaters or room heaters. The operating instructions shall be attached to the appliance where they can be read easily. <b>305.1 Accessibility for Service.</b> All gas utilization equipment shall be located with respect to building construction and other equipment so as to permit access to the gas utilization equipment. Sufficient clearance shall be maintained to permit cleaning of heating surfaces; the replacement of filters, blowers, motors, burners, controls, and vent connections; the lubrication of moving parts where necessary; the adjustment and cleaning of burners and pilots; and the proper functioning of explosion vents, if provided. For attic installation, the passageway and servicing area adjacent to the equipment shall be floored. <b>904.10.3.1</b> Gas utilization equipment located on roofs or other elevated locations shall be accessible. <b>904.10.3.2</b> Buildings of more than 15 ft. (4.6 m) in height shall have an inside means of access to the roof, unless other means acceptable to the Authority Having Jurisdiction are used. <b>904.10.3.3</b> The inside means of access shall be a permanent or foldaway inside stairway or ladder, terminating in an enclosure, scuttle, or trapdoor. Such scuttles or trapdoors shall be at least 22 in. x 24 in. (560 mm x 610 mm) in size, shall open easily and safely under all conditions, especially snow, and shall be constructed so as to permit access from the roof side unless deliberately locked on the inside. At least 6 ft. (1.8 m) of clearance shall be available between the access opening and the edge of the roof or similar hazard, or rigidly fixed rails or guards a minimum of 42 in. (1.1 m) in height shall be provided on the exposed side. Where parapets or other building structures are utilized in lieu of guards or rails, they shall be a minimum of 42 in.

IBC Code Section	IMC Code Section	UMC Code Section
	<p><b>Committee Comments &amp; Action</b></p> <p><input checked="" type="checkbox"/> The requirements are equivalent.</p> <p>Discussion by the Committee: None</p> <p>Discussion from the floor:</p> <ul style="list-style-type: none"> <li>• CBSC staff asked if there was a section in the UMC directed to under-floor access to furnaces or appliances.</li> </ul> <p>Discussion by the Committee:</p> <ul style="list-style-type: none"> <li>• UMC §§305.0 and 305.1 cover access requirements for any location.</li> </ul> <p>Passed by a unanimous vote.</p>	<p>(1.1 m) in height.</p> <p><b>904.10.3.4</b> Permanent lighting shall be provided at the roof access. The switch for such lighting shall be located inside the building near the access means leading to the roof.</p> <p><b>912.8 Access.</b> The space in which any floor furnace is installed shall be accessible by an opening in the foundation not less than 24 in. x 18 in. (610 mm x 460 mm) or by a trapdoor not less than 24 in. x 24 in. (610 mm x 610 mm) in any cross-section thereof, and a passageway not less than 24 in. x 18 in. (610 mm x 460 mm) in any cross-section thereof. [NFPA 54:9.11.8]</p>
<p><b>ITEM 41</b></p> <p><b>2304.5 Framing around flues and chimneys.</b> Combustible framing shall be a minimum of 2 inches (51 mm), but shall not be less than the distance specified in Sections 2111 and 2113 and the <i>International Mechanical Code</i>, from flues, chimneys and fireplaces, and 6 inches (152 mm) away from flue openings.</p>	<p><b>801.18.4 Clearances.</b> [Existing] Chimneys and vents shall have air-space clearance to combustibles in accordance with the <i>International Building Code</i> and the chimney or vent manufacturer's installation instructions.</p> <p><b>Exception:</b> Masonry chimneys equipped with a chimney lining system tested and listed for installation in chimneys in contact with combustibles in accordance with UL 1777, and installed in accordance with the manufacturer's instructions, shall not be required to have clearance between combustible materials and exterior surfaces of the masonry chimney. Noncombustible fireblocking shall be provided in accordance with the <i>International Building Code</i>.</p> <p><b>802.8 Insulation shield.</b> Where [Type B-, L- and pellet] vents pass through insulated assemblies, an insulation shield constructed of not less than No. 26 Gage sheet metal shall be installed to provide clearance between the vent and the insulation material. The clearance shall be not less than the clearance to combustibles specified by the vent manufacturer's installation instructions. Where vents pass through attic space, the shield shall terminate not less than 2 inches (51mm) above the insulation materials and shall be secured in place to prevent displacement. Insulation shields provided as part of a listed vent system shall be installed in accordance with the manufacturer's installation instructions.</p> <p><b>Refer</b> to IMC §803.10.4, Table 803.10.4, §803.10.6, and Table</p>	<p>Table 3-3 and Table 8-2</p> <p><b>802.7.4.4</b> Minimum clearances from single-wall metal pipe to combustible material shall be in accordance with Table 8-2.</p> <p><b>802.10.5 Clearance.</b> Minimum clearances from vent connectors to combustible material shall be in accordance with Table 8-2.</p> <p><b>Exception:</b> The clearance between a vent connector and combustible material shall be permitted to be reduced where the combustible material is protected as specified for vent connectors in Table 5-3.</p> <p><b>802.12.7 Clearance.</b> A draft hood shall be located so that its relief opening is not less than 6 in. (150 mm) from any surface except that of the equipment it serves and the venting system to which the draft hood is connected. Where a greater or lesser clearance is indicated on the equipment label, the clearance shall not be less than that specified on the label. Such clearances shall not be reduced. [NFPA 54:10.12]</p>

IBC Code Section	IMC Code Section	UMC Code Section
	803.10.6, whose length preclude their reproduction on this chart. <b>Committee Comments &amp; Action</b> <input checked="" type="checkbox"/> The requirements are equivalent. Discussion by the Committee: <ul style="list-style-type: none"> <li>When asked whether there were different clearance requirements in the IMC and UMC, the committee referred to the tables not shown in this chart for both codes, including UMC Table 5-2 not referenced above.</li> </ul> Discussion from the floor: None Passed by a unanimous vote.	
<b>ITEM 42</b> <b>CHAPTER 28</b> <b>MECHANICAL SYSTEMS</b> <b>SECTION 2801 GENERAL</b> <b>2801.1 Scope.</b> Mechanical appliances, equipment and systems shall be constructed, installed and maintained in accordance with the <i>International Mechanical Code</i> and the <i>International Fuel Gas Code</i> . Masonry chimneys, fireplaces and barbecues shall comply with the <i>International Mechanical Code</i> and Chapter 21 of this code.	<b>Refer</b> to IMC Chapter 9 for those §§ concerning mechanical appliances, whose length preclude their reproduction on this chart  <b>Refer</b> to IMC §§801 and 803 concerning masonry chimneys, fireplaces, and barbecues, whose length preclude their reproduction on this chart	Refer to Chapters 3 and 9, 2003 UMC  <b>802.5.1 Listing or Construction.</b> <b>802.5.1.1</b> Factory-built chimneys shall be installed in accordance with their listing and the manufacturers' instructions. Factory-built chimneys used to vent appliances that operate at positive vent pressure shall be listed for such application. <b>802.5.1.2</b> Metal chimneys shall be built and installed in accordance with NFPA 211, Standard for Chimneys, Fireplaces, Vents, and Solid-Fuel-Burning Appliances. <b>802.5.1.3</b> Masonry Chimney shall be built and installed in accordance with NFPA 211, Standard for Chimneys, Fireplaces, Vents, and Solid-Fuel-Burning Appliances, and lined with approved clay flue lining, a listed chimney lining system, or other approved material that will resist corrosion, erosion, softening, or cracking from vent gases at temperatures up to 1800°F (982°C). <b>Exception:</b> Masonry chimney flues lined with a chimney lining system specifically listed for use with listed gas appliances with draft hoods, Category I appliances, and other gas appliances listed for use with Type B vents shall be permitted. The liner shall be installed in accordance with the liner manufacturer's instructions and the terms of the listing. A permanent identifying label shall be attached at the point where the connection is to be made to the liner. The label shall read: "This chimney liner is for appliances that burn gas only. Do not connect to solid or liquid-fuel-burning appliances or incinerators."
	<b>Committee Comments &amp; Action</b> <input checked="" type="checkbox"/> The requirements are equivalent. Discussion by the Committee: <ul style="list-style-type: none"> <li>Seventeen additional sections and seven additional tables in the UMC have provisions for masonry chimneys.</li> </ul> Discussion from the floor: None Passed by a unanimous vote.	
<b>ITEM 43</b> <b>3004.3.1 Reduced vent area.</b> Where mechanical ventilation	<b>501.3 Pressure equalization.</b> Mechanical exhaust systems shall be sized to remove the quantity of air required by this chapter to be exhausted. The system shall operate when air is required to be	For §505.1, see Item 37 above; for §505.2, see Item 27 above; and for §506.0, see Item 17 above.

IBC Code Section	IMC Code Section	UMC Code Section
<p>conforming to the <b>International Mechanical Code</b> is provided, a reduction in the required vent area is allowed provided that all of the following conditions are met:</p> <ol style="list-style-type: none"> <li>1. The occupancy is not in Group R-1, R-2, I-1 or I-2 or of a similar occupancy with overnight sleeping quarters.</li> <li>2. The vents required by Section 3004.2 do not have outside exposure.</li> <li>3. The hoistway does not extend to the top of the building.</li> <li>4. The hoistway and machine room exhaust fan is automatically reactivated by thermostatic means.</li> <li>5. Equivalent venting of the hoistway is accomplished.</li> </ol> <p>[The intent is to vent smoke and hot gases in case of fire.]</p>	<p>exhausted. Where mechanical exhaust is required in a room or space in other than occupancies in Group R-3, such space shall be maintained with a neutral or negative pressure. If a greater quantity of air is supplied by a mechanical ventilating supply system than is removed by a mechanical exhaust system for a room, adequate means shall be provided for the natural exit of the excess air supplied. If only a mechanical exhaust system is installed for a room or if a greater quantity of air is removed by a mechanical exhaust system than is supplied by a mechanical ventilating supply system for a room, adequate means shall be provided for the natural supply of the deficiency in the air supplied.</p> <p><b>501.4 Ducts.</b> Where exhaust duct construction is not specified in this chapter, such construction shall comply with Chapter 6.</p> <p><b>502.1 General.</b> An exhaust system shall be provided, maintained and operated as specifically required by this section and for all occupied areas where machines, vats, tanks, furnaces, forges, salamanders and other appliances, equipment and processes in such areas produce or throwoff dust or particles sufficiently light to float in the air, or which emit heat, odors, fumes, spray, gas or smoke, in such quantities so as to be irritating or injurious to health or safety.</p> <p>...</p> <p><b>502.1.3 Equipment, appliance and service rooms.</b> Equipment, appliance and system service rooms that house sources of odors, fumes, noxious gases, smoke, steam, dust, spray or other contaminants shall be designed and constructed so as to prevent spreading of such contaminants to other occupied parts of the building.</p> <p><b>Committee Comments &amp; Action</b></p> <p><input checked="" type="checkbox"/> The requirements are equivalent.</p> <p>Discussion by the Committee: None</p> <p>Discussion from the floor:</p> <ul style="list-style-type: none"> <li>• CBSC staff pointed out the note in the IBC column above concerning the intent of the IBC §, should it influence the committee's analysis.</li> </ul> <p>Passed by a unanimous vote.</p>	
<p><b>ITEM 44</b></p> <p><b>3401.3 Compliance with other codes.</b> Alterations, repairs, additions and changes of occupancy to existing structures shall comply with the provisions for alterations, repairs, additions and changes of occupancy</p>	<p><b>[EB] 102.4 Additions, alterations or repairs.</b> Additions, alterations, renovations or repairs to a mechanical system shall conform to that required for a new mechanical system without requiring the existing mechanical system to comply with all of the requirements of this code. Additions, alterations or repairs shall not cause an existing mechanical system to become unsafe, hazardous or overloaded.</p>	<p><b>104.1 Additions, Alterations, or Repairs.</b> Additions, alterations, or repairs may be made to any mechanical system without requiring the existing mechanical system to comply with all the requirements of this code, provided the addition, alteration, or repair conforms to that required for a new mechanical system. Additions, alterations, or repairs shall not cause an existing system to become unsafe or create unhealthy or overloaded</p>

IBC Code Section	IMC Code Section	UMC Code Section
<p>in the <i>International Fire Code</i>, <i>International Fuel Gas Code</i>, <i>International Plumbing Code</i>, <i>International Property Maintenance Code</i>, <i>International Private Sewage Disposal Code</i>, <i>International Mechanical Code</i>, <i>International Residential Code</i> and <i>ICC Electrical Code</i>.</p>	<p>Minor additions, alterations, renovations and repairs to existing mechanical systems shall meet the provisions for new construction, unless such work is done in the same manner and arrangement as was in the existing system, is not hazardous and is approved.</p> <p><b>[EB] 102.5 Change in occupancy.</b> It shall be unlawful to make a change in the occupancy of any structure which will subject the structure to any special provision of this code applicable to the new occupancy without approval. The code official shall certify that such structure meets the intent of the provisions of law governing building construction for the proposed new occupancy and that such change of occupancy does not result in any hazard to the public health, safety or welfare.</p> <p><b>Committee Comments &amp; Action</b></p> <p><input checked="" type="checkbox"/> The requirements are equivalent.</p> <p>Discussion by the Committee: None</p> <p>Discussion from the floor: None</p> <p>Passed by a unanimous vote.</p>	<p>conditions. Minor additions, alterations, and repairs to existing mechanical systems may be installed in accordance with the law in effect at the time the original installation was made, when approved by the Authority Having Jurisdiction.</p> <p><b>104.2 Existing Installations.</b> Mechanical systems lawfully in existence at the time of the adoption of this code may have their use, maintenance, or repair continued if the use, maintenance, or repair is in accordance with the original design and location and no hazard to life, health, or property has been created by such mechanical systems.</p> <p><b>104.3 Changes in Building Occupancy.</b> Mechanical systems that are a part of any building or structure undergoing a change in use or occupancy, as defined in the Building Code, shall comply with all requirements of this code that may be applicable to the new use or occupancy.</p>
<p><b>ITEM 45</b></p> <p><b>3410.6.7 HVAC systems.</b> Evaluate the ability of the HVAC system to resist the movement of smoke and fire beyond the point of origin. Under the categories in Section 3409.6.7.1, determine the appropriate value and enter that value into Table 3410.7 under Safety Parameter 3410.6.7, HVAC Systems, for fire safety, means of egress and general safety.</p> <p><b>3410.6.7.1 Categories.</b> The categories for HVAC systems are:</p> <ol style="list-style-type: none"> <li>1. Category a — Plenums not in accordance with <i>Section 602 of the International Mechanical Code</i>. -10 points.</li> <li>2. Category b — Air movement in egress elements not in accordance with Section 1016.4. -5 points.</li> <li>3. Category c—Both categories a and b are applicable. -15 points.</li> <li>4. Category d — Compliance of the</li> </ol>	<p><b>Refer</b> to IMC §602, whose length precludes its reproduction on this chart</p> <p><b>Refer</b> to IMC §602, whose length precludes its reproduction on this chart</p>	<p><b>Refer</b> to UMC §602.2, whose length precludes its reproduction on this chart</p> <p><b>Refer</b> to UMC §602.2, whose length precludes its reproduction on this chart</p>

IBC Code Section	IMC Code Section	UMC Code Section
<p>HVAC system with Section 1016.4 and Section 602 of the <i>International Mechanical Code</i>. 0 points.</p> <p>5. Category e—Systems serving one story; or a central boiler/chiller system without ductwork connecting two or more stories. 5 points.</p>	<p><b>Committee Comments &amp; Action</b></p> <p><input checked="" type="checkbox"/> The requirements are equivalent.</p> <p>Discussion by the Committee:</p> <ul style="list-style-type: none"> <li>The categories in the IBC section above are for evaluating HVAC systems in existing buildings.</li> <li>IMC §602 and UMC §602.2 are equivalent sections covering requirements for combustibles in plenums.</li> </ul> <p>Discussion from the floor: None</p> <p>Passed by a unanimous vote.</p>	
<p><b>ITEM 46</b></p> <p><b>3410.6.8 Automatic fire detection.</b> Evaluate the smoke detection capability based on the location and operation of automatic fire detectors in accordance with Section 907 and the <i>International Mechanical Code</i>. Under the categories and occupancies in Table 3410.6.8, determine the appropriate value and enter that value into Table 3410.7 under Safety Parameter 3410.6.8, Automatic Fire Detection, for fire safety, means of egress and general safety.</p>	<p><b>606.1 Controls required.</b> Air distribution systems shall be equipped with smoke detectors listed and labeled for installation in air distribution systems, as required by this section.</p> <p><b>606.2 Where required.</b> Smoke detectors shall be installed where indicated in Sections 606.2.1 through 606.2.3.</p> <p><b>Exception:</b> Smoke detectors shall not be required where air distribution systems are incapable of spreading smoke beyond the enclosing walls, floors and ceilings of the room or space in which the smoke is generated.</p> <p><b>606.2.1 Return air systems.</b> Smoke detectors shall be installed in return air systems with a design capacity greater than 2,000 cfm (0.9 m<sup>3</sup>/s), in the return air duct or plenum upstream of any filters, exhaust air connections, outdoor air connections, or decontamination equipment and appliances.</p> <p><b>Exception:</b> Smoke detectors are not required in the return air system where all portions of the building served by the air distribution system are protected by area smoke detectors connected to a fire alarm system in accordance with the <i>International Fire Code</i>. The area smoke detection system shall comply with Section 606.4.</p> <p><b>606.2.2 Common supply and return air systems.</b> Where multiple air-handling systems share common supply or return air ducts or plenums with a combined design capacity greater than 2,000 cfm (0.9 m<sup>3</sup>/s), the return air system shall be provided with smoke detectors in accordance with Section 606.2.1.</p> <p><b>Exception:</b> Individual smoke detectors shall not be required for each fan-powered terminal unit, provided that such units do not have an individual design capacity greater than 2,000 cfm (0.9 m<sup>3</sup>/s) and will be shut down by activation of one of the following:</p> <ol style="list-style-type: none"> <li>Smoke detectors required by Sections 606.2.1 and 606.2.3.</li> <li>An approved area smoke detector system located in the return air plenum serving such units.</li> <li>An area smoke detector system as prescribed in the exception to Section 606.2.1.</li> </ol> <p>In all cases, the smoke detectors shall comply with Sections</p>	<p><b>609.0 Automatic Shutoffs.</b> Air-moving systems supplying air in excess of 2000 cubic feet per minute (944 L/s) to enclosed spaces within buildings shall be equipped with an automatic shutoff. Automatic shutoff shall be accomplished by interrupting the power source of the air-moving equipment upon detection of smoke in the main supply-air duct served by such equipment. Smoke detectors shall be labeled by an approved agency for air duct installation and shall be installed in accordance with the manufacturer's approved instructions. Such devices shall be compatible with the operating velocities, pressures, temperatures and humidities of the system. Where fire-detection or alarm systems are provided for the building, the smoke detectors required by this section shall be supervised by such systems.</p> <p><b>Exceptions:</b></p> <ol style="list-style-type: none"> <li>(1) When the space supplied by the air-moving equipment is served by a total coverage smoke-detection system complying with the Fire Code, interconnection to such system may be used to accomplish the required shutoff.</li> <li>(2) Automatic shutoff is not required when all occupied rooms served by the air-handling equipment have direct exit to the exterior and the travel distance does not exceed 100 feet (30,480 mm).</li> <li>(3) Automatic shutoff is not required for Group R, Division 3 and Group U Occupancies.</li> <li>(4) Automatic shutoff is not required for approved smoke-control systems or where analysis demonstrates shutoff would create a greater hazard such as may be encountered in air-moving equipment supplying specialized portions of Group H Occupancies. Such equipment shall be required to have smoke detection with remote indication and manual shutoff capability at an approved location.</li> <li>(5) Smoke detectors that are factory installed in listed air-moving equipment may be used in lieu of smoke detectors installed in the main supply-air duct served by such equipment.</li> </ol>

IBC Code Section	IMC Code Section	UMC Code Section
	<p>606.4 and 606.4.1.</p> <p><b>606.2.3 Return air risers.</b> Where return air risers serve two or more stories and serve any portion of a return air system having a design capacity greater than 15,000 cfm (7.1m<sup>3</sup>/s), smoke detectors shall be installed at each story. Such smoke detectors shall be located upstream of the connection between the return air riser and any air ducts or plenums.</p> <p><b>606.3 Installation.</b> Smoke detectors required by this section shall be installed in accordance with NFPA 72. The required smoke detectors shall be installed to monitor the entire airflow conveyed by the system including return air and exhaust or relief air. Access shall be provided to smoke detectors for inspection and maintenance.</p> <p><b>606.4 Controls operation.</b> Upon activation, the smoke detectors shall shut down the air distribution system. Air distribution systems that are part of a smoke control system shall switch to the smoke control mode upon activation of a detector.</p> <p><b>606.4.1 Supervision.</b> The duct smoke detectors shall be connected to a fire alarm system. The actuation of a duct smoke detector shall activate a visible and audible supervisory signal at a constantly attended location.</p> <p><b>Exceptions:</b></p> <ol style="list-style-type: none"> <li>1. The supervisory signal at a constantly attended location is not required where the duct smoke detector activates the building's alarm-indicating appliances.</li> <li>2. In occupancies not required to be equipped with a fire alarm system, actuation of a smoke detector shall activate a visible and an audible signal in an approved location. Duct smoke detector trouble conditions shall activate a visible or audible signal in an approved location and shall be identified as air duct detector trouble.</li> </ol> <p><b>Committee Comments &amp; Action</b></p> <p><input checked="" type="checkbox"/> The requirements are equivalent.  Discussion by the Committee: None  Discussion from the floor: None  Passed by a unanimous vote.</p>	
<p><b>ITEM 47</b></p> <p><b>3410.6.8.1 Categories.</b> The categories for automatic fire detection are:</p> <ol style="list-style-type: none"> <li>1. Category a — None.</li> <li>2. Category b—Existing smoke detectors in HVAC systems and</li> </ol>		

IBC Code Section	IMC Code Section	UMC Code Section
<p>maintained in accordance with the <i>International Fire Code</i>.</p> <p>3. Category c—Smoke detectors in HVAC systems. The detectors are installed in accordance with the requirements for new buildings in the <i>International Mechanical Code</i>.</p> <p>4. Category d — Smoke detectors throughout all floor areas other than individual guestrooms, tenant spaces and dwelling units.</p> <p>5. Category e—Smoke detectors installed throughout the fire area.</p>	<p>See Item 46 above.</p>	<p>See Item 46 above</p>
	<p><b>Committee Comments &amp; Action</b></p> <p><input checked="" type="checkbox"/> The requirements are equivalent.</p> <p>Discussion by the Committee: None</p> <p>Discussion from the floor: None</p> <p>Passed by a unanimous vote.</p>	

IBC Code Section	IPC Code Sections	UPC Code Sections
<p><b>ITEM 48</b>  <b>415.7.4 Dry cleaning plants.</b> The construction and installation of dry cleaning plants shall be in accordance with the requirements of this code, the <i>International Mechanical Code</i>, the <i>International Plumbing Code</i> and NFPA 32. Dry cleaning solvents and systems shall be classified in accordance with the <i>International Fire Code</i>.</p>	<p>No specific section in IPC found.</p> <p><b>Committee Comments &amp; Action</b>  <input checked="" type="checkbox"/> The requirements are equivalent  Discussion by the Committee: None  Discussion from the floor:  <ul style="list-style-type: none"> <li>CBSC staff asked the ICC representative if there was a referenced section staff had missed.</li> </ul> Discussion by the Committee:  <ul style="list-style-type: none"> <li>Nothing specific other than general piping requirements could be found in either the IMC or UMC.</li> <li>The committee recommended removing the reference to the IPC in the IBC.</li> </ul> Discussion from the floor: Commenter agreed with removing the reference to the IPC in the IBC. to the IPC in the IBC.  Passed by a unanimous vote.</p>	<p>No requirements in the 2003 UPC</p>
<p><b>ITEM 49</b>  <b>603.1.2 Piping.</b> The use of combustible piping materials shall be permitted when installed in accordance with the limitations of the <i>International Mechanical Code</i> and the <i>International Plumbing Code</i>.</p>	<p><b>303.2 Installation of materials.</b> All materials used shall be installed in strict accordance with the standards under which the materials are accepted and approved. In the absence of such installation procedures, the manufacturer's installation instructions shall be followed. Where the requirements of referenced standards or manufacturer's installation instructions do not conform to minimum provisions of this code, the provisions of this code shall apply.</p> <p><b>303.3 Plastic pipe, fittings and components.</b> All plastic pipe, fittings and components shall be third-party certified as conforming to NSF 14.</p> <p><b>303.4 Third-party testing and certification.</b> All plumbing products and materials shall comply with the referenced standards, specifications and performance criteria of this code and shall be identified in accordance with Section 303.1. When required by Table 303.4, plumbing products and materials shall either be tested by an approved third-party testing agency or certified by an approved third-party certification agency.</p> <p style="text-align: center;"><b>TABLE 303.4</b>  <b>PRODUCTS AND MATERIALS REQUIRING THIRD-PARTY TESTING AND THIRD-PARTY CERTIFICATION</b></p>	<p><b>301.0 Materials – Standards and Alternates.</b>  <b>301.1 Minimum Standards.</b>  <b>301.1.1 Approvals.</b> All pipe, pipe fittings, traps, fixtures, material, and devices used in a plumbing system shall be listed or labeled (third-party certified) by a listing agency (accredited conformity assessment body) and shall conform to approved applicable recognized standards referenced in this code, and shall be free from defects. Unless otherwise provided for in this code, all materials, fixtures, or devices used or entering into the construction of plumbing systems, or parts thereof, shall be submitted to the Authority Having Jurisdiction for approval.  <b>301.1.2 Marking.</b> Each length of pipe and each pipe fitting, trap, fixture, material, and device used in a plumbing system shall have cast, stamped, or indelibly marked on it the manufacturer's mark or name which shall readily identify the manufacturer to the end user of the product when such marking is required by the approved standard that applies. When required by the approved standard that applies the product shall be marked with the weight and the quality of the product. All materials and devices used or entering into the construction of plumbing and drainage systems, or parts thereof, shall be marked and identified in a manner satisfactory to the Authority Having Jurisdiction. All such marking shall be done by the manufacturer. Field marking shall not be acceptable.  <b>301.1.3 Standards.</b> Standards listed or referred to in this chapter or other chapters cover materials which will conform to the requirements of this code, when used in accordance with the limitations imposed in this or other chapters thereof and their listing. Where a standard covers materials of various grades, weights,</p>

IBC Code Section	IPC Code Sections			UPC Code Sections
	<b>PRODUCT OR MATERIAL</b>	<b>THIRD-PARTY CERTIFIED</b>	<b>THIRD-PARTY TESTED</b>	<p>quality, or configurations, there may be only a portion of the listed standard which is applicable. Design and materials for special conditions or materials not provided for herein may be used only by special permission of the Authority Having Jurisdiction after the Authority Having Jurisdiction has been satisfied as to their adequacy. A list of accepted plumbing materials standards is included in Table 14-1. All IAPMO Installation Standards are included in Appendix I for the convenience of the users of this code. They are not considered as a part of this code unless formally adopted as such by the Authority Having Jurisdiction.</p>
	Portable water supply system components and potable water fixture fittings	Required	—	
	Sanitary drainage and vent system components	Plastic pipe, fittings and pipe-related components	All others	
	Waste fixture fittings	Plastic pipe, fittings and pipe-related components	All others	
	Storm drainage system components	Plastic pipe, fittings and pipe-related components	All others	
	Plumbing fixtures	—	Required	
	Plumbing appliances	Required	—	
	Backflow prevention devices	Required	—	
	Water distribution system safety devices	Required	—	
	Special waste system components	—	Required	
	Subsoil drainage system components	—	Required	
	<b>Committee Comments &amp; Action</b> <input checked="" type="checkbox"/> The requirements are equivalent Discussion by the Committee: None Discussion from the floor: None Passed by a unanimous vote.			
<b>ITEM 50</b> <b>717.5 Combustibles in concealed spaces in Type I or II construction.</b> Combustibles shall not be permitted in concealed spaces of buildings of Type I or II construction. <b>Exceptions:</b> 1. Combustible materials in accordance with Section 603. 2. Combustible materials complying with Section 602 of the <i>International Mechanical Code</i> . 3. Class A interior finish materials.		<b>701.1.2</b> ABS and PVC DWV piping installations shall be installed in accordance with IS 5, IS 9, and Chapter 15 "Firestop Protection." Except for individual single-family dwelling units, materials exposed within ducts or plenums shall have a flame-spread index of not more than 25 and a smoke-developed index of not more than 50, when tested in accordance with the Test for Surface - Burning Characteristics of the Building Materials. (See the Building Code standards based on ASTM E-84 and ANSI/UL 723.) <b>1101.3 Material Uses.</b> Rainwater piping placed within the interior of a building or run within a vent or shaft shall be of cast iron, galvanized steel, wrought iron, brass, copper, lead, Schedule 40 ABS DWV, Schedule 40 PVC DWV, or other approved materials, and changes in direction shall conform to the requirements of		

IBC Code Section	IPC Code Sections	UPC Code Sections
<p>4. Combustible piping within partitions or enclosed shafts installed in accordance with the provisions of this code. Combustible piping shall be permitted within concealed ceiling spaces where installed in accordance with the <i>International Mechanical Code</i> and the <i>International Plumbing Code</i>.</p>	<p><b>307.6 Piping materials exposed within plenums.</b> All piping materials exposed within plenums shall comply with the provisions of the <i>International Mechanical Code</i>. [See ITEM 25]</p> <p><b>Committee Comments &amp; Action</b>  <input checked="" type="checkbox"/> The requirements are equivalent  Discussion by the Committee: None  Discussion from the floor:  <ul style="list-style-type: none"> <li>CBSA staff asked if there was a referenced section staff had missed concerning water piping.</li> </ul> Discussion by the Committee:  <ul style="list-style-type: none"> <li>IMC §602.2.1 only addresses fire sprinkler piping, not water piping.</li> </ul> Discussion from the floor: None.  Passed by a unanimous vote.</p>	<p>Section 706.0. ABS and PVC DWV piping installations shall be installed in accordance with IS 5, IS 9, and Chapter 15 "Firestop Protection." Except for individual single-family dwelling units, materials exposed within ducts or plenums shall have a flame-spread index of not more than 25 and a smoke-developed index of not more than 50, when tested in accordance with the Test for Surface-Burning Characteristics of the Building Materials (See the Building Code standards based on ASTM E-84 and ANSI/UL 723.). [No requirements for water piping found]</p>
<p><b>ITEM 51</b>  <b>[F] 903.3.5 Water supplies.</b> Water supplies for automatic sprinkler systems shall comply with this section and the standards referenced in Section 903.3.1. The potable water supply shall be protected against backflow in accordance with the requirements of this section and the <i>International Plumbing Code</i>.</p>	<p><b>608.16.4 Connections to automatic fire sprinkler systems and standpipe systems.</b> The potable water supply to automatic fire sprinkler and standpipe systems shall be protected against backflow by a double check-valve assembly or a reduced pressure principle backflow preventer.  <b>Exceptions:</b>  1. Where systems are installed as a portion of the water distribution system in accordance with the requirements of this code and are not provided with a fire department connection, isolation of the water supply system shall not be required.  2. Isolation of the water distribution system is not required for deluge, preaction or dry pipe systems.  <b>608.16.4.1 Additives or nonpotable source.</b> Where systems under continuous pressure contain chemical additives or antifreeze, or where systems are connected to a nonpotable secondary water supply, the potable water supply shall be protected against backflow by a reduced pressure principle backflow preventer. Where chemical additives or antifreeze are added to only a portion of an automatic fire sprinkler or standpipe system, the reduced pressure principle backflow preventer shall be permitted to be located so as to isolate that portion of the system. Where systems are not under continuous pressure, the potable water supply shall be protected against backflow by an air gap or a pipe applied atmospheric vacuum breaker conforming to</p>	<p><b>603.4.18 Protection from Fire Systems.</b>  <b>603.4.18.1</b> Except as provided under Sections 603.4.18.2 and 603.4.18.3, potable water supplies to fire protection systems that are normally under pressure, including but not limited to standpipes and automatic sprinkler systems, except in one- or two family residential sprinkler systems, piped in materials approved for potable water distribution systems shall be protected from back-pressure and back-siphonage by one of the following testable devices:  (1) Double check valve assembly  (2) Double check detector assembly  (3) Reduced pressure backflow preventer  (4) Reduced pressure detector assembly  Potable water supplies to fire protection systems that are not normally under pressure shall be protected from backflow and shall meet the requirements of the appropriate standards referenced in Table 14-1.  <b>603.4.18.2</b> Where fire protection systems supplied from a potable water system include a fire department (siamese) connection which is located less than seventeen hundred (1700) feet (518.2 m) from a non-potable water source that could be used by the fire department as a secondary water supply, the potable water supply shall be protected by one of the following:  (1) Reduced pressure backflow preventer</p>

IBC Code Section	IPC Code Sections	UPC Code Sections
	<p>ASSE 1001 or CAN/CSA B64.1.1.</p> <p><b>Committee Comments &amp; Action</b></p> <p><input checked="" type="checkbox"/> The requirements are equivalent</p> <p>Discussion by the Committee: None</p> <p>Discussion from the floor: None</p> <p>Passed by a unanimous vote.</p>	<p>(2) Reduced pressure detector assembly</p> <p><b>Note:</b></p> <p>Non-potable water sources include fire department vehicles carrying water of questionable quality or water that is treated with antifreeze, corrosion inhibitors, or extinguishing agents.</p> <p><b>603.4.18.3</b> Where antifreeze, corrosion inhibitors, or other chemicals are added to a fire protection system supplied from a potable water supply, the potable water system shall be protected by one of the following:</p> <p>(1) Reduced pressure backflow preventer</p> <p>(2) Reduced pressure detector assembly</p>
<p><b>ITEM 52</b></p> <p><b>1109.2 Toilet and bathing facilities.</b> Toilet rooms and bathing facilities shall be accessible. Where a floor level is not required to be connected by an accessible route, the only toilet rooms or bathing facilities provided within the facility shall not be located on the inaccessible floor. At least one of each type of fixture, element, control or dispenser in each accessible toilet room and bathing facility shall be accessible.</p> <p><b>Exceptions:</b></p> <p>4. Toilet room fixtures that are in excess of those required by the <i>International Plumbing Code</i> and that are designated for use by children in day care and primary school occupancies.</p>	<p><b>Not Applicable:</b> California rewrites Chapter 11 and may or may not include a similar provision.</p>	<p><b>Not Applicable:</b> California rewrites Chapter 11 and may or may not include a similar provision.</p>
<p><b>ITEM 53</b></p> <p><b>1206.3.3 Court drainage.</b> The bottom of every court shall be properly graded and drained to a public sewer or other approved disposal system complying with the</p>	<p><b>1101.2 Where required.</b> All roofs, paved areas, yards, <b>courts and courtyards</b> shall drain into a separate storm sewer system, or a combined sewer system, or to an approved place of disposal. For one- and two-family dwellings, and where approved, storm water is permitted to discharge onto flat areas, such as streets or lawns, provided that the storm water flows away from the building.</p>	<p><b>1101.1 Where Required.</b> All roofs, paved areas, yards, <b>courts, and courtyards</b> shall be drained into a separate storm sewer system, or into a combined sewer system where a separate storm sewer system is not available, or to some other place of disposal satisfactory to the Authority Having Jurisdiction. In the case of one- and two-family dwellings, storm water may be discharged on</p>

IBC Code Section	IPC Code Sections	UPC Code Sections
<p><i>International Plumbing Code.</i></p>	<p><b>Committee Comments &amp; Action</b>  <input checked="" type="checkbox"/> The requirements are equivalent  Discussion by the Committee: None  Discussion from the floor: None  Passed by a unanimous vote.</p>	<p>flat areas such as streets or lawns so long as the storm water shall flow away from the building and away from adjoining property, and shall not create a nuisance.</p>
<p><b>ITEM 54</b>  <b>[P] 1503.4 Roof drainage.</b> Design and installation of roof drainage systems shall comply with the <i>International Plumbing Code.</i></p> <p><b>[Note: 2001 CBC §1506.1 General.</b> Roofs shall be sloped a minimum of 1 unit vertical in 48 units horizontal (2% slope) for drainage unless designed for water accumulation in accordance with Section 1611 and approved by the building official. <b>2003 IBC §1611</b> addresses Rain Loads, but is not referenced by Chapter 15.]</p>	<p><b>1101.7 Roof design.</b> Roofs shall be designed for the maximum possible depth of water that will pond thereon as determined by the relative levels of roof deck and overflow weirs, scuppers, edges or serviceable drains in combination with the deflected structural elements. In determining the maximum possible depth of water, all primary roof drainage means shall be assumed to be blocked.</p> <p><b>1110.1 General.</b> The roof of a structure shall be designed for the storage of water where the storm drainage system is engineered for controlled flow. The controlled flow roof drain system shall be an engineered system in accordance with this section and the design, submittal, approval, inspection and testing requirements of Section 105.4. The controlled flow system shall be designed based on the required rainfall rate in accordance with Section 1106.1.</p> <p><b>Committee Comments &amp; Action</b>  <input checked="" type="checkbox"/> The requirements are equivalent  Discussion by the Committee: None  Discussion from the floor:  <ul style="list-style-type: none"> <li>CBSC explained the note in the IBC column was a concern by the structural safety group that a reference to Chapter 16 of the Building Code for roof design for ponding is in the UBC.</li> </ul> Discussion by the Committee:  <ul style="list-style-type: none"> <li>UMC §1101.11.3 would appear to cover structural concerns.</li> </ul> Discussion from the floor: None.  Passed by a unanimous vote.</p>	<p><b>1101.11.1 Primary Roof Drainage.</b> Roof areas of a building shall be drained by roof drains or gutters. The location and sizing of drains and gutters shall be coordinated with the structural design and pitch of the roof. Unless otherwise required by the Authority Having Jurisdiction, roof drains, gutters, vertical conductors or leaders, and horizontal storm drains for primary drainage shall be sized based on a storm of sixty (60) minutes duration and 100-year return period.</p> <p><b>1101.11.3 Equivalent Systems.</b> When approved by the Authority Having Jurisdiction, the requirements of Sections 1101.11.1 and 1101.11.2 shall not preclude the installation of an engineered roof drainage system that has sufficient capacity to prevent water from ponding on the roof in excess of that allowed in the roof structural design with a rainfall rate of at least twice that for a 100-year, 60-minute storm and with a blockage in any single point in the storm drainage system.</p> <p><b>1108.0 Controlled-Flow Roof Drainage.</b>  <b>1108.1 Application.</b>  (7) Roof design, where controlled-flow roof drainage is used, shall be such that the minimum design roof live load is thirty (30) pounds per square foot (146.5 kg/m<sup>2</sup>) to provide a safety factor above the fifteen (15) pounds per square foot (73.2 kg/m<sup>2</sup>) represented by the depth of water stored on the roof as indicated in Table 11-4.</p>

IBC Code Section	IPC Code Sections	UPC Code Sections														
<b>ITEM 55</b> <b>1807.4.3 Drainage discharge.</b> The floor base and foundation perimeter drain shall discharge by gravity or mechanical means into an approved drainage system that complies with the <i>International Plumbing Code</i> . <b>Exception:</b> Where a site is located in well-drained gravel or sand/gravel mixture soils, a dedicated drainage system is not required.	<b>1102.5 Subsoil drain pipe.</b> Subsoil drains shall be horizontally split or perforated pipe conforming to one of the standards listed in Table 1102.5.  <b>TABLE 1102.5</b> SUBSOIL DRAIN PIPE <table><tr><th>MATERIAL</th><th>STANDARD</th></tr><tr><td>Asbestos-cement pipe</td><td>ASTM C 508</td></tr><tr><td>Cast-iron pipe</td><td>ASTM A 74; ASTM A 888; CISPI 301</td></tr><tr><td>Polyethylene (PE) plastic pipe</td><td>ASTM F 405</td></tr><tr><td>Polyvinyl chloride (PVC) Plastic pipe (type sewer pipe, PS25, PS50 or PS100)</td><td>ASTM D 2729; ASTM F 891; CSA-B 182.2; CAN/CSA-B182.4</td></tr><tr><td>Vitrified clay pipe</td><td>ASTM C 4; ASTM C 700</td></tr><tr><td>Stainless steel drainage Systems, Type 316L</td><td>ASME A112.3.1</td></tr></table>	MATERIAL	STANDARD	Asbestos-cement pipe	ASTM C 508	Cast-iron pipe	ASTM A 74; ASTM A 888; CISPI 301	Polyethylene (PE) plastic pipe	ASTM F 405	Polyvinyl chloride (PVC) Plastic pipe (type sewer pipe, PS25, PS50 or PS100)	ASTM D 2729; ASTM F 891; CSA-B 182.2; CAN/CSA-B182.4	Vitrified clay pipe	ASTM C 4; ASTM C 700	Stainless steel drainage Systems, Type 316L	ASME A112.3.1	<b>1102.5 Subsoil Drains.</b> <b>1102.5.1</b> Subsoil drains shall be constructed of materials specified in Table 14-1. <b>1102.5.2</b> Subsoil drains shall be open-jointed or of perforated pipe, vitrified clay, plastic, cast iron, or porous concrete.
MATERIAL	STANDARD															
Asbestos-cement pipe	ASTM C 508															
Cast-iron pipe	ASTM A 74; ASTM A 888; CISPI 301															
Polyethylene (PE) plastic pipe	ASTM F 405															
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Vitrified clay pipe	ASTM C 4; ASTM C 700															
Stainless steel drainage Systems, Type 316L	ASME A112.3.1															
	<b>Committee Comments &amp; Action</b> <input checked="" type="checkbox"/> The requirements are equivalent Discussion by the Committee: None Discussion from the floor: None Passed by a unanimous vote.															
<b>ITEM 56</b> <b>2901.1 Scope.</b> The provisions of this chapter and the <i>International Plumbing Code</i> shall govern the erection, installation, alteration, repairs, relocation, replacement, addition to, use or maintenance of plumbing equipment and systems. Plumbing systems and equipment shall be constructed, installed and maintained in accordance with the <i>International Plumbing Code</i> . Private sewage disposal systems shall conform to the <i>International Private Sewage Disposal Code</i> .	General references to Chapter 29, which contains Table 29 for minimum number of required fixtures and specific occupancy requirements, and to the IPC, which contains the same provisions in Chapter 4.	<b>Chapter 4 and Table 4-1</b>          <b>Appendix K</b>														

IBC Code Section	IPC Code Sections	UPC Code Sections
	<b>Committee Comments &amp; Action</b> <input checked="" type="checkbox"/> The requirements are equivalent Discussion by the Committee: None Discussion from the floor: None Passed by a unanimous vote.	
<b>ITEM 57</b> <b>2902.1.1 Unisex toilet and bath fixtures.</b> Fixtures located within unisex toilet bathing rooms complying with Section 404 of the <i>International Plumbing Code</i> are permitted to be included in determining the minimum required number of fixtures for assembly and mercantile occupancies.	<b>SECTION 404</b> <b>ACCESSIBLE PLUMBING FACILITIES</b> <b>404.1 Where required.</b> Accessible plumbing facilities and fixtures shall be provided in accordance with the <i>International Building Code</i> . <b>[Note:</b> This section refers to access requirements in the building code.]  <b>[B]403.1.1 Unisex toilet and bath fixtures.</b> Fixtures located within unisex toilet and bathing rooms complying with Section 404 are permitted to be included in determining the minimum required number of fixtures for assembly and mercantile occupancies.  <b>Committee Comments &amp; Action</b> <input checked="" type="checkbox"/> The requirements are equivalent Discussion by the Committee: None Discussion from the floor: None Passed by a unanimous vote. Discussion by the Committee: <ul style="list-style-type: none"> <li>• Asked if the CBSC will handle the IBC reference to specific §404 in the IPC.</li> </ul> Discussion from the floor: <ul style="list-style-type: none"> <li>• CBSC staff answered in the affirmative. </li></ul>	
<b>ITEM 58</b> <b>3305.1 Facilities required.</b> Sanitary facilities shall be provided during construction, remodeling or demolition activities in accordance with the <i>International Plumbing Code</i> .	<b>SECTION 311</b> <b>TOILET FACILITIES FOR WORKERS</b> <b>311.1 General.</b> Toilet facilities shall be provided for construction workers and such facilities shall be maintained in a sanitary condition. Construction worker toilet facilities of the nonsewer type shall conform to ANSI Z4.3.  <b>Committee Comments &amp; Action</b> <input checked="" type="checkbox"/> The requirements are equivalent Discussion by the Committee: None Discussion from the floor: <ul style="list-style-type: none"> <li>• CBSC staff asked if there was anything in the UMC referring to ANSI Z4.3.</li> </ul> Discussion by the Committee: <ul style="list-style-type: none"> <li>• UMC Table 4-1, Footnote 6 covers the same requirement.</li> </ul> Discussion from the floor: None. Passed by a unanimous vote. [Post-meeting, CBSC staff looked up Table 4-1, Footnote 6. It refers to Sanitation in Places of Employment, ANSI Z4.1-1968 and is	
		<b>413.3 Separate Facilities.</b> Separate toilet facilities shall be provided for each sex. <b>Exceptions:</b> (1) Residential installations. (2) In occupancies serving ten (10) or fewer people, one (1) toilet facility, designed for use by no more than one (1) person at a time, shall be permitted for use by both sexes. (3) In business and mercantile occupancies with a total floor area of fifteen hundred (1500) square feet (139.5 m2) or less, one (1) toilet facility, designed for use by no more than one (1) person at a time, shall satisfy the requirements for serving customers and employees of both sexes.

IBC Code Section	IPC Code Sections	UPC Code Sections
<p><b>ITEM 59</b>  <b>3401.3 Compliance with other codes.</b> Alterations, repairs, additions and changes of occupancy to existing structures shall comply with the provisions for alterations, repairs, additions and changes of occupancy in the <i>International Fire Code</i>, <i>International Fuel Gas Code</i>, <i>International Plumbing Code</i>, <i>International Property Maintenance Code</i>, <i>International Private Sewage Disposal Code</i>, <i>International Mechanical Code</i>, <i>International Residential Code</i> and <i>ICC Electrical Code</i>.</p>	referred from Industrial <sup>6</sup> Warehouses, etc.]	
	<p><b>[EB] 102.4 Additions, alterations or repairs.</b> Additions, alterations, renovations or repairs to any plumbing system shall conform to that required for a new plumbing system without requiring the existing plumbing system to comply with all the requirements of this code. Additions, alterations or repairs shall not cause an existing system to become unsafe, insanitary or overloaded.</p> <p>Minor additions, alterations, renovations and repairs to existing plumbing systems shall be permitted in the same manner and arrangement as in the existing system, provided that such repairs or replacement are not hazardous and are approved.</p> <p><b>[EB] 102.5 Change in occupancy.</b> It shall be unlawful to make any change in the occupancy of any structure that will subject the structure to any special provision of this code without approval of the code official. The code official shall certify that such structure meets the intent of the provisions of law governing building construction for the proposed new occupancy and that such change of occupancy does not result in any hazard to the public health, safety or welfare.</p>	<p><b>101.5.1 Additions, Alterations, or Repairs.</b>  Additions, alterations, or repairs may be made to any plumbing system without requiring the existing plumbing system to comply with all the requirements of this code, provided the addition, alteration, or repair conforms to that required for a new plumbing system. Additions, alterations, or repairs shall not cause an existing system to become unsafe, insanitary, or overloaded.</p> <p><b>101.5.2 Health and Safety.</b> Whenever compliance with all the provisions of this code fails to eliminate or alleviate a nuisance, or any other dangerous or insanitary condition which may involve health or safety hazards, the owner or the owner's agent shall install such additional plumbing and drainage facilities or shall make such repairs or alterations as may be ordered by the Authority Having Jurisdiction.</p> <p><b>101.4.1.1.1</b> In existing buildings or premises in which plumbing installations are to be altered, repaired, or renovated, deviations from the provisions of this code are permitted, provided such deviations are found to be necessary and are first approved by the Authority Having Jurisdiction.</p> <p><b>101.5.4 Changes in Building Occupancy.</b>  Plumbing systems which are a part of any building or structure undergoing a change in use or occupancy, as defined in the Building code, shall comply to all requirements of this code which may be applicable to the new use or occupancy.</p>
	<p><b>Committee Comments &amp; Action</b></p> <p><input checked="" type="checkbox"/> The requirements are equivalent</p> <p>Discussion by the Committee: None</p> <p>Discussion from the floor: None</p> <p>Passed by a unanimous vote.</p>	

IBC Code Section	IFGC Code Sections	UPC/UMC Code Sections
<p><b>ITEM 60</b>  <b>415.7.3 Liquefied petroleum gas-distribution facilities.</b> The design and construction of propane, butane, propylene, butylene and other liquefied petroleum gas-distribution facilities shall conform to the applicable provisions of Sections 415.7.3.1 through 415.7.3.5.2. The storage and handling of liquefied petroleum gas systems shall conform to the <i>International Fire Code</i>. The design and installation of piping, equipment and systems that utilize liquefied petroleum gas shall be in accordance with the <i>International Fuel Gas Code</i>. Liquefied petroleum gas-distribution facilities shall be ventilated in accordance with the <i>International Mechanical Code</i> and Section 415.7.3.1.</p>	<p>General reference to the entire IFGC, whose length precludes its reproduction in this chart. Based on NFPA 54.</p> <p><b>Committee Comments &amp; Action</b>  <input checked="" type="checkbox"/> The requirements are equivalent  Discussion by the Committee: <ul style="list-style-type: none"> <li>Requested confirmation by ICC or IAPMO that, while the IFGC covers natural and LPG connections, ventilation, combustion air, etc., the UMC covers other fuels.</li> <li>IAPMO's representative stated that the UMC makes reference to NFPA 58 for propane and NFPA 31 for oil.</li> </ul> Discussion from the floor: None  Passed by a unanimous vote.</p>	<p>UPC Chapter 12 (UMC Chapter 13) addresses fuel piping installations. Chapter 8 of the UMC addresses ventilation of gas appliances. Chapter 9 of the UMC addresses specific mechanical appliances. All of these chapters are based on, and reprint portions of, NFPA 54.</p>
<p><b>ITEM 61</b>  <b>2113.11.1.2 Gas appliances.</b> Flue lining systems for gas appliances shall be in accordance with the <i>International Fuel Gas Code</i>.</p>	<p><b>501.12 Residential and low-heat appliances flue lining systems.</b> Flue lining systems for use with residential-type and low-heat appliances shall be limited to the following:  1. Clay flue lining complying with the requirements of ASTM C 315 or equivalent. Clay flue lining shall be installed in accordance with the <i>International Building Code</i>.  2. Listed chimney lining systems complying with UL1777.  3. Other approved materials that will resist, without cracking, softening or corrosion, flue gases and condensate at temperatures up to 1,800°F (982°C).  <b>501.13 Category I appliance flue lining systems.</b> Flue lining systems for use with Category I appliances shall be limited to the following:  1. Flue lining systems complying with Section 501.12.  2. Chimney lining systems listed and labeled for use with gas</p>	<p><b>802.5.1.3</b> Masonry chimneys shall be built and installed in accordance with NFPA 211, Standard for Chimneys, Fireplaces, Vents, and Solid-Fuel-Burning Appliances, and lined with approved clay flue lining, a listed chimney lining system, or other approved material that will resist corrosion, erosion, softening, or cracking from vent gases at temperatures up to 1800°F (982°C).</p>

IBC Code Section	IFGC Code Sections	UPC/UMC Code Sections
	<p>appliances with draft hoods and other Category I gas appliances listed and labeled for use with Type B vents.</p> <p><b>503.5.3 Masonry chimneys.</b> Masonry chimneys shall be built and installed in accordance with NFPA 211 and shall be lined with approved clay flue lining, a listed chimney lining system, or other approved material that will resist corrosion, erosion, softening, or cracking from vent gases at temperatures up to 1800°F (982°C).</p> <p><b>Exception:</b> Masonry chimney flues serving listed gas appliances with draft hoods, Category I appliances, and other gas appliances listed for use with Type B vent shall be permitted to be lined with a chimney lining system specifically listed for use only with such appliances. The liner shall be installed in accordance with the liner manufacturer's instructions and the terms of the listing. A permanent identifying label shall be attached at the point where the connection is to be made to the liner. The label shall read: "This chimney liner is for appliances that burn gas only. Do not connect to solid or liquid fuel-burning appliances or incinerators."</p> <p><b>503.5.6.1 Chimney lining.</b> Chimneys shall be lined in accordance with NFPA 211.</p> <p><b>Exception:</b> Existing chimneys shall be permitted to have their use continued when an appliance is replaced by an appliance of similar type, input rating, and efficiency.</p> <p><b>503.10.2.5 Medium-heat appliances.</b> Vent connectors for medium-heat equipment and commercial and industrial incinerators shall be constructed of factory-built medium-heat chimney sections or steel of a thickness not less than that specified in Table 503.10.2.5 and shall comply with the following:</p> <ol style="list-style-type: none"> <li>1. A steel vent connector for equipment with a vent gas temperature in excess of 1000°F (538°C), measured at the entrance to the connector shall be lined with medium-duty fire brick (ASTM C 64, Type F), or the equivalent.</li> <li>2. The lining shall be at least 2 1/2 inches (64 mm) thick for a vent connector having a diameter or greatest cross-sectional dimension of 18 inches (457 mm) or less.</li> <li>3. The lining shall be at least 4 1/2 inches (114 mm) thick laid on the 4 1/2-inch (114 mm) bed for a vent connector having a diameter or greatest cross-sectional dimension greater than 18 inches (457 mm).</li> <li>4. Factory-built chimney sections, if employed, shall be joined together in accordance with the chimney manufacturers' instructions.</li> </ol> <p><b>504.2.7 Liner system sizing.</b> Listed corrugated metallic chimney liner systems in masonry chimneys shall be sized by using Table 504.2(1) or 504.2(2) for Type B vents with the maximum capacity</p>	<p><i>Exception: Masonry chimney flues lined with a chimney lining system specifically listed for use with listed gas appliances with draft hoods, Category I appliances, and other gas appliances listed for use with Type B vents shall be permitted. The liner shall be installed in accordance with the liner manufacturer's instructions and the terms of the listing. A permanent identifying label shall be attached at the point where the connection is to be made to the liner. The label shall read: "This chimney liner is for appliances that burn gas only. Do not connect to solid or liquid-fuel-burning appliances or incinerators."</i></p> <p><b>802.5.4 Inspection of Chimneys</b></p> <p><b>(B)</b> Chimneys shall be lined in accordance with NFPA 211, Standard for Chimneys, Fireplaces, Vents and Solid-Fuel-Burning Appliances.</p> <p>...</p> <p><b>(D)</b> When inspection reveals that an existing chimney is not safe for the intended application, it shall be repaired, rebuilt, lined, relined, or replaced with a vent or chimney to conform to NFPA 211, Standard for Chimneys, Fireplaces, Vents, and Solid-Fuel-Burning Appliances, and shall be suitable for the equipment to be attached.</p> <p><b>802.10.2.6</b> Vent connectors for medium-heat equipment and commercial and industrial incinerators shall be constructed of factory-built, medium-heat chimney sections or steel of a thickness not less than that specified in Table 8-4, and shall comply with the following:</p> <ol style="list-style-type: none"> <li>(1) A steel vent connector for equipment with a vent gas temperature in excess of 1000°F (538°C) measured at the entrance to the connector shall be lined with medium-duty fire brick (ASTM C 64, Specification for Refractories for Incinerators and Boilers, Type F) or the equivalent.</li> <li>(2) The lining shall be at least 2-1/2 in. (64 mm) thick for a vent connector having a diameter or greatest cross-sectional dimension of 18 in. (460 mm) or less.</li> <li>(3) The lining shall be at least 4-1/2 in. (110 mm) thick laid on the 4-1/2 in. (110 mm) bed for a vent connector having a diameter or greatest cross-sectional dimension greater than 18 in. (460 mm).</li> <li>(4) Factory-built chimney sections, if employed, shall be joined together in accordance with the chimney manufacturer's instructions.</li> </ol> <p><b>803.1.7</b> Listed corrugated metallic chimney liner systems in masonry chimneys shall be sized by using Tables 8-5 or 8-6 for Type B vents with the maximum capacity reduced by 20% (0.80</p>

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	<p>reduced by 20 percent (0.80 x maximum capacity) and the minimum capacity as shown in Table 504.2(1) or 504.2(2). Corrugated metallic liner systems installed with bends or offsets shall have their maximum capacity further reduced in accordance with Section 504.2.3. The 20-percent reduction for corrugated metallic chimney liner systems includes an allowance for one long-radius 90-degree (157 rad) turn at the bottom of the liner. (<b>§504.3.19</b> for multiple appliances similar)</p> <p><b>Committee Comments &amp; Action</b>  <input checked="" type="checkbox"/> The requirements are equivalent  Discussion by the Committee: None  Discussion from the floor: None  Passed by a unanimous vote.</p>	<p>maximum capacity) and the minimum capacity as shown in Table 8-5 or 8-6. Corrugated metallic liner systems installed with bends or offsets shall have their maximum capacity further reduced in accordance with 803.1.3. The 20% reduction for corrugated metallic chimney liner systems includes an allowance for one long radius 90 degree turn at the bottom of the liner. (<b>§803.2.18</b> for multiple appliances similar)</p>
<p><b>ITEM 62</b>  <b>2113.15 Flue area (appliance).</b>  Chimney flues shall not be smaller in area than the area of the connector from the appliance. Chimney flues connected to more than one appliance shall not be less than the area of the largest connector plus 50 percent of the areas of additional chimney connectors.  <b>Exceptions:</b>  1. Chimney flues serving oil-fired appliances sized in accordance with NFPA 31.  2. Chimney flues serving gas-fired appliances sized in accordance with the <b>International Fuel Gas Code.</b></p> <p><b>ITEM 62</b>  <b>Committee Comments &amp; Action</b></p>	<p><b>501.4 Minimum size of chimney or vent.</b> Chimneys and vents shall be sized in accordance with Section 504.  <b>501.15.1 Size.</b> The [existing] chimney or vent shall be resized as necessary to control flue gas condensation in the interior of the chimney or vent and to provide the appliance or appliances served with the required draft. For Category I appliances, the resizing shall be in accordance with Section 502.  <b>503.5.5 Size of chimneys.</b> The effective area of a chimney venting system serving listed appliances with draft hoods, Category I appliances, and other appliances listed for use with Type B vents shall be determined in accordance with one of the following methods:  1. The provisions of Section 504. [§504 and Tables: "Sizing of Category I Appliance Venting Systems."]  2. For sizing an individual chimney venting system for a single appliance with a draft hood, the effective areas of the vent connector and chimney flue shall be not less than the area of the appliance flue collar or draft hood outlet, nor greater than seven times the draft hood outlet area.  3. For sizing a chimney venting system connected to two appliances with draft hoods, the effective area of the chimney flue shall be not less than the area of the larger draft hood outlet plus 50 percent of the area of the smaller draft hood outlet, nor greater than seven times the smallest draft hood outlet area.  4. Chimney venting systems using mechanical draft shall be sized in accordance with approved engineering methods.  5. Other approved engineering methods.</p>	<p><b>802.5.3 Size of Chimneys.</b> The effective area of a chimney venting system serving listed gas appliances with draft hoods, Category I appliances, and other appliances listed for use with Type B vents shall be in accordance with one of the following methods:  (1) Section 803.0. [§803 and Tables: "Sizing of Category I Venting Systems"]  (2) For sizing an individual chimney venting system for a single appliance with a draft hood, the effective areas of the vent connector and chimney flue shall be not less than the area of the appliance flue collar or draft hood outlet or greater than seven times the draft hood outlet area.  (3) For sizing a chimney venting system connected to two appliances with draft hoods, the effective area of the chimney flue shall be not less than the area of the larger draft hood outlet plus 50 percent of the area of the smaller draft hood outlet, or greater than seven times the smallest draft hood outlet area.  (4) Other approved engineering methods.  (5) Chimney venting systems using mechanical draft shall be sized in accordance with approved engineering methods. Where an incinerator is vented by a chimney serving other gas utilization equipment, the gas input to the incinerator shall not be included in calculating chimney size, provided the chimney flue diameter is not less than 1 in. (25 mm) larger in equivalent diameter than the diameter of the incinerator flue outlet.</p>

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	<p><b>Committee Comments &amp; Action</b></p> <p><input checked="" type="checkbox"/> The requirements are equivalent  Discussion by the Committee: None  Discussion from the floor: None  Passed by a unanimous vote.</p> <p><b>Closing Comments</b></p> <p>Comments by the Chair:</p> <ul style="list-style-type: none"> <li>• Thanked the representatives of ICC and APMO for invaluable assistance in interpretation for the committee.</li> <li>• Acknowledged that the direct comparison of code sections may not have been the best means of determining the technical adequacy of California's codes.</li> </ul> <p>Comments from the floor:</p> <ul style="list-style-type: none"> <li>• Commissioner Pernell thanked the committee for its contribution which allows the Commission to follow the process towards the adoption of California's building codes.</li> </ul>	